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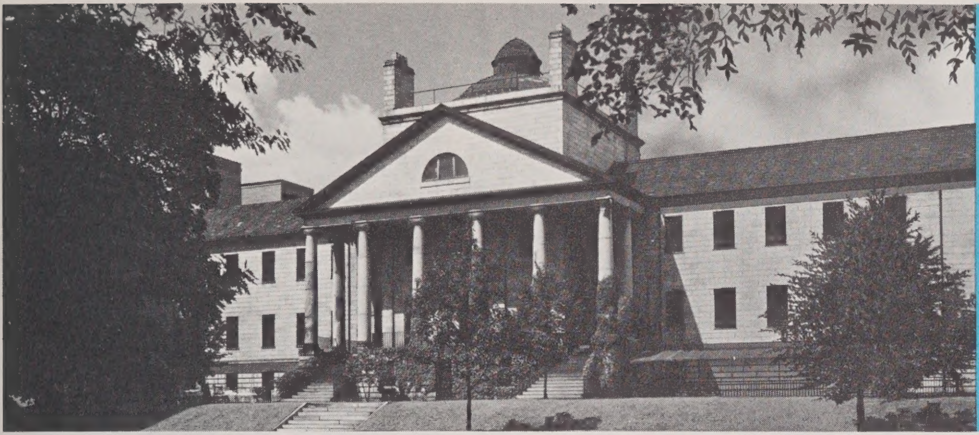

MGH News

Vol. 27 No. 1 MASSACHUSETTS GENERAL HOSPITAL, BOSTON, MASSACHUSETTS June, 1968

On Trial at MGH: Automated Patient "Interviews"

A teletypewriter linked to a computer is "interviewing" selected MGH patients.

The experimental program is designed to learn how practical it is for machines to relieve the physician of the routine part of taking a patient's history.

In operation several months, the system has been tried on more than 75 persons. How well is it working?

"It is our belief it represents a feasible means of collecting certain portions of the medical history," Dr. Jerome Grossman said. "Both patients and physicians are enthusiastic."

Dr. Grossman is working on the project with Dr. G. Octo Barnett, director of the Laboratory of Computer Science. Other physicians participating are Dr. John D. Stoeckle, Dr. William Strole, Dr. Michael T. McGuire, Dr. Robert Greenes, Dr. Roger H. Sweet and members of the house staff.

One of the prime concerns was how well the unskilled patient can use the teletypewriter.

"The patient's ability to handle the technique has been excellent," Dr. Grossman said. "It works for almost anyone who can read English."

The patient sits at a teletypewriter. In response to a computer, the teletype prints out questions that require the selection of a multiple-choice answer.

"Do you smoke?" If the patient answers that he does not, the next question will delve into another area. Should he respond that he does, the next query will be, "How much do you smoke?"

A patient may be asked as many as

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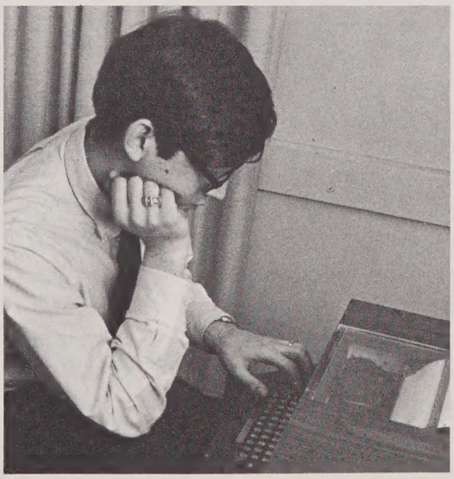

Trying out a computer-linked teletypewriter is David B. Swedlow, who will enter Harvard Medical School in the fall.

Charlestown Project: "A Bold New Approach"

Massachusetts General Hospital intends to launch a bold new approach to comprehensive medicine in its Charlestown project, Dr. John H. Knowles declared in his annual report.

A plan would be drawn up in conjunction with all the organizations concerned with the health of a community, the general director wrote.

"It is the overall aim of this program," he continued, "to develop a health service system which will represent all the skills, manpower and resources required to cultivate high level physical, cognitive, and psychologic health and competence during the formative years of pregnancy, infancy and childhood, and to prevent, detect, and treat disease and disability as necessary to maintain optimal health throughout life.

"A new committee on community programs has been developed whose primary interest at the present time is the development of a comprehensive ambulatory care program for the roughly 16,000 residents of Charlestown.

"This committee has received the wholehearted support of all of our professors and chiefs of service and represents a most important new functional departure for the MGH.

"It recognizes the need for the acute, curative teaching hospital to actively extend its services to the community through holistic concepts of comprehensive care and preventive medicine."

The aim is to improve the organization, distribution and use of health services. To date, the MGH has spent nearly two years considering some of the complexities of the project.

Nor does Dr. Knowles minimize the problems.

"The political difficulties attendant upon contracts or grants with multiple funding agencies (city, state and federal)," he wrote, "which lack uniform procedures amongst themselves may prove to be a very difficult if not insurmountable task.

"We do know that the federal government is most anxious for us to make this application so that it may help them to develop one funding agency for such comprehensive and holistic health planning and health services.

". . . This is an exciting and crucial

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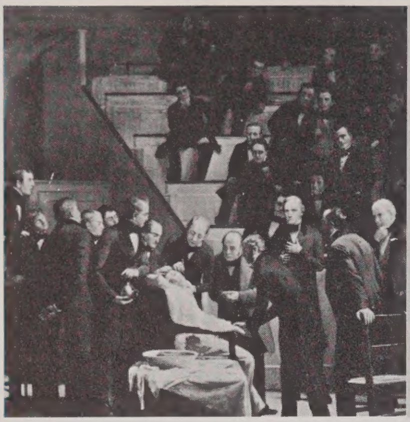

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MGH News: Renaissance and Troika

A good newsmagazine should both inform and entertain. A well-conceived story can perform both functions. To be accurate, even medical news need not be abstruse and dull.

If it is too technical, an article on immunology, for example, may prove incomprehensible even to a highly competent physician. It is said that in this era of specialization, doctors once outside their own field are laymen. Moreover, articles written in a clear and entertaining way are much more likely to etch a permanent engraving in the mind than those carried out in a pompous, pedantic or pedestrian manner.

It is with this rather lofty troika of accuracy, clarity and interest that the *MGH News* hopes to enter a new era. Our desire is to bring the world of the MGH to the interested layman as well as the doctor. We hope to present news that will prove stimulating and exciting, not only to the MGH family, but also to others outside this great complex.

If this occasionally means discussing timely medical topics unrelated to the MGH, we shall do this. Although we are the publication of a single institution, we hope our selection and treatment of articles will raise us above the merely parochial. Our purpose, then, is to make the *News* as great in its own right as the hospital it represents.

Harvard Takes a Much-Needed Step

Members of the Faculty of Medicine at Harvard University have passed a resolution seeking to "substantially increase the number of Negro medical students" there. At present, the medical school has six Negroes, the dental school, none. Some faculty members are aiming at as many as 15 for admission each year. The resolution calls for a number of "suitably named scholarships for Negro students." Dr. Robert H. Ebert, dean of the Faculty of Medicine, has already appointed a 12-member committee to implement the resolution.

Harvard's action could not have come too soon. Certainly, no better step could be taken to raise the health standards of the ghetto than to increase the number of Negro physicians. Only 2.2 per cent of the nation's doctors are Negroes. Yet Negroes make up 11.4 per cent of the population. The national ratio is 132 physicians per 100,000 population, but there are only 20 Negro physicians per 100,000. In 1967-68 there are only an estimated 750 Negroes among the nation's 32,000 medical students. What is worse, the number of Negroes in medical schools has remained the same since 1956 while the total number of medical students has risen by about 4,000.

The University of California at San Francisco has admitted 12 to 14 Negroes for its 1968 entering class. Recruiting programs like theirs and the one at Harvard are to be encouraged — and helped.

Life on Earth??? Not Very Likely!!!

A Martian photographing the earth from his planet would be hard pressed to find evidence of life here.

Only extremely high resolution satellite photographs show much detail, an expert on life in the universe told an MGH audience.

"At the very highest resolution, you could notice a very large number of geometric patterns," Dr. Carl Sagan of the Smithsonian Astrophysical Observatory said.

Showing a high resolution aerial slide of a number of cows in a plowed field, Dr. Sagan said:

"If one had never seen a quadruped before . . . he might think he was looking at a field loaded with stilted lumps."

Dr. Sagan outlined the many handicaps to astronomers searching for proof of life beyond our planet. At the same time, he said that the countless number of galaxies and stars in the universe make extraterrestrial life highly likely.

Dr. Sagan spoke at the May meeting of the MGH's new Research Colloquia. Held at Harvard's Holyoke Center, it was the third in the previously unpublicized series.

Prof. George Wald of Harvard began the series last November with a talk on "Mechanisms of Human Vision." Dr. Wald had been invited to inaugurate the colloquia before he won the Nobel Prize for his research on that subject.

Dr. Leon Eisenberg, new chief of psychiatry at the MGH, spoke in November on "Development of Intelligence."

Dr. Kurt J. Isselbacher, chairman of the committee on research, said:

"We started the colloquia to increase communication among scientists and

The *MGH News* welcomes letters from its readers. To avoid condensation, letters should be brief. They must be signed and should contain the writer's title or department at the MGH and home address. Names will be withheld on request.

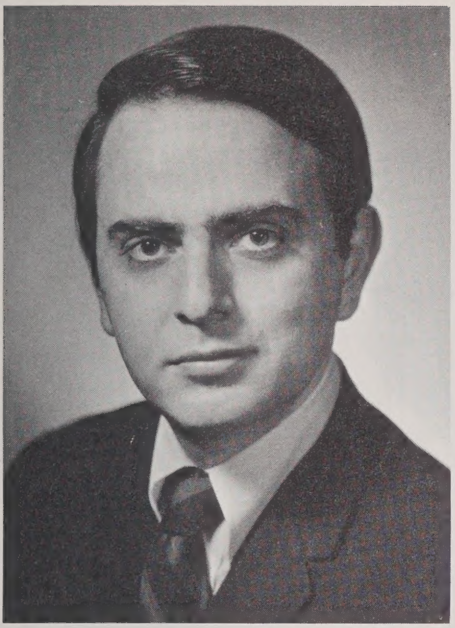


Photo by Fabian Bachrach

DR. CARL SAGAN

investigators at the MGH. We recognize by virtue of the size of the institution there is frequently inadequate communication between senior and junior investigators."

Members of the committee on research and its subcommittees have been attending the sessions.

Dr. Isselbacher is anxious for a greater scientific as well as social interaction within the MGH research community. With a social hour preceding the talks and discussion periods after, the colloquia seem to be achieving that end.

Orthopedists Vote Dr. Rowe Association's President Elect

Dr. Carter R. Rowe, visiting orthopedic surgeon here, will become the fourth MGH physician to head the American Orthopedic Association.

He was voted president-elect of the organization at the annual meeting in Boca Raton, Fla., April 26. In 1970, he will represent the association at the Combined Meeting of English Speaking Orthopedic Associations in Sydney, Australia.

Dr. Rowe interned at the MGH in 1938-39. He was appointed assistant in orthopedic surgery in 1947 and assistant orthopedic surgeon in 1952.

Other MGH physicians to head the association were Drs. E. G. Brackett in 1904, Robert Osgood in 1920 and Edwin F. Cave in 1960.

"INTERVIEWS"

(Continued from Page 1)

200 questions. He needs from 30 minutes to an hour to complete his dialogue with the computer. It takes from three to five minutes to explain to him how to use the teletype.

"Our principal goal," Dr. Grossman said, "is to better utilize the physician's time.

"Many people are concerned with depersonalization and lack of doctor-patient relationship. If we can collect much of the standard data without involving the physician, he will have time to go into more detail in areas of concern revealed by the computer history taking.

Delivery of Care

". . . The way in which we deliver care will change greatly in the next few years. This program represents just one of many projects within the Harvard community which is concerned with the problems of delivering health services."

By collecting standardized coded information, the patient-history experiment will contribute data useful in clinical research. For example, investigators will collect useful data on the prevalence of symptoms in diseased and healthy populations.

Other groups are also working on computerized history-taking studies: The University of Wisconsin, Mayo Clinic and Kaiser Permanente.

"Our program," Dr. Grossman said, "is somewhat of a departure from previous history-taking studies in that we are concerned with the evaluation of this technique, both in terms of the validity of the data collected and in its significance and usefulness in patient management."

To carry out the project, the research team has set up teletype terminals in a newly-formed clinic of the outpatient department. From 10 to 15 patients a week are taking part at this new medical consultation clinic.

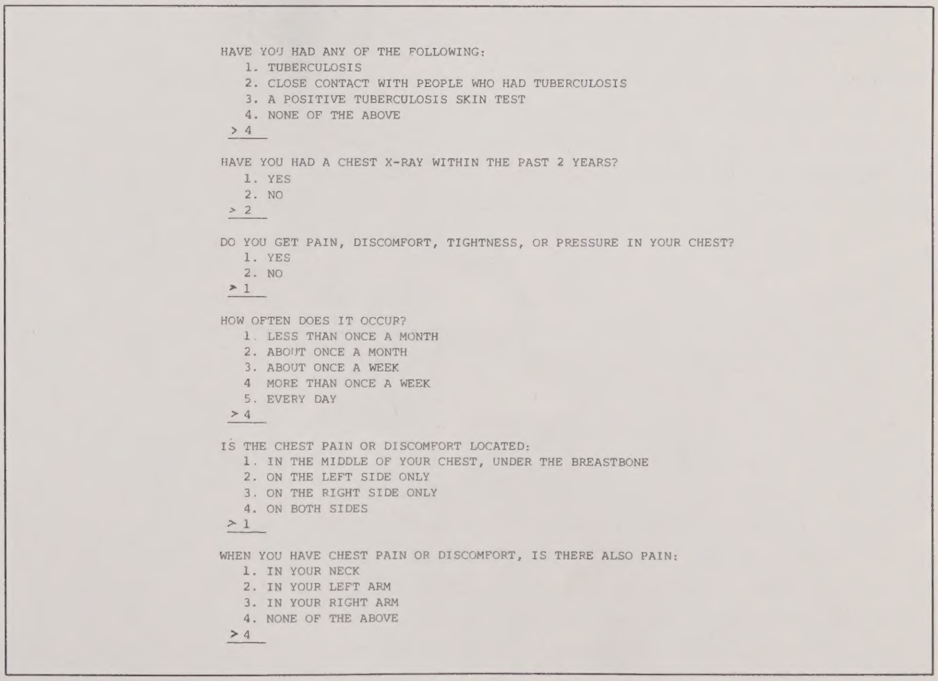
In addition, the scientists have set up separate studies involving inpatients.

"The acquisition of medical information by history taking is a relatively poorly defined activity that varies from doctor to doctor," Dr. Grossman said. "The use of the computer allows experimentation in developing sets of questions that will elicit meaningful responses."

The researchers realize that the computer cannot replace the doctor. It cannot observe the non-verbal behavior of the patient. The machine can record, but it cannot evaluate hesitations in replying or get intuitive feelings.

What the computer has already shown, however, makes it a promising tool.

And the experiment is only one of a series being conducted by the Laboratory of Computer Science under the sponsorship of the National Institutes of Health and Public Health Service.



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HAVE YOU HAD ANY OF THE FOLLOWING:
   1. TUBERCULOSIS
   2. CLOSE CONTACT WITH PEOPLE WHO HAD TUBERCULOSIS
   3. A POSITIVE TUBERCULOSIS SKIN TEST
   4. NONE OF THE ABOVE
 > 4

HAVE YOU HAD A CHEST X-RAY WITHIN THE PAST 2 YEARS?
   1. YES
   2. NO
 > 2

DO YOU GET PAIN, DISCOMFORT, TIGHTNESS, OR PRESSURE IN YOUR CHEST?
   1. YES
   2. NO
 > 1

HOW OFTEN DOES IT OCCUR?
   1. LESS THAN ONCE A MONTH
   2. ABOUT ONCE A MONTH
   3. ABOUT ONCE A WEEK
   4  MORE THAN ONCE A WEEK
   5. EVERY DAY
 > 4

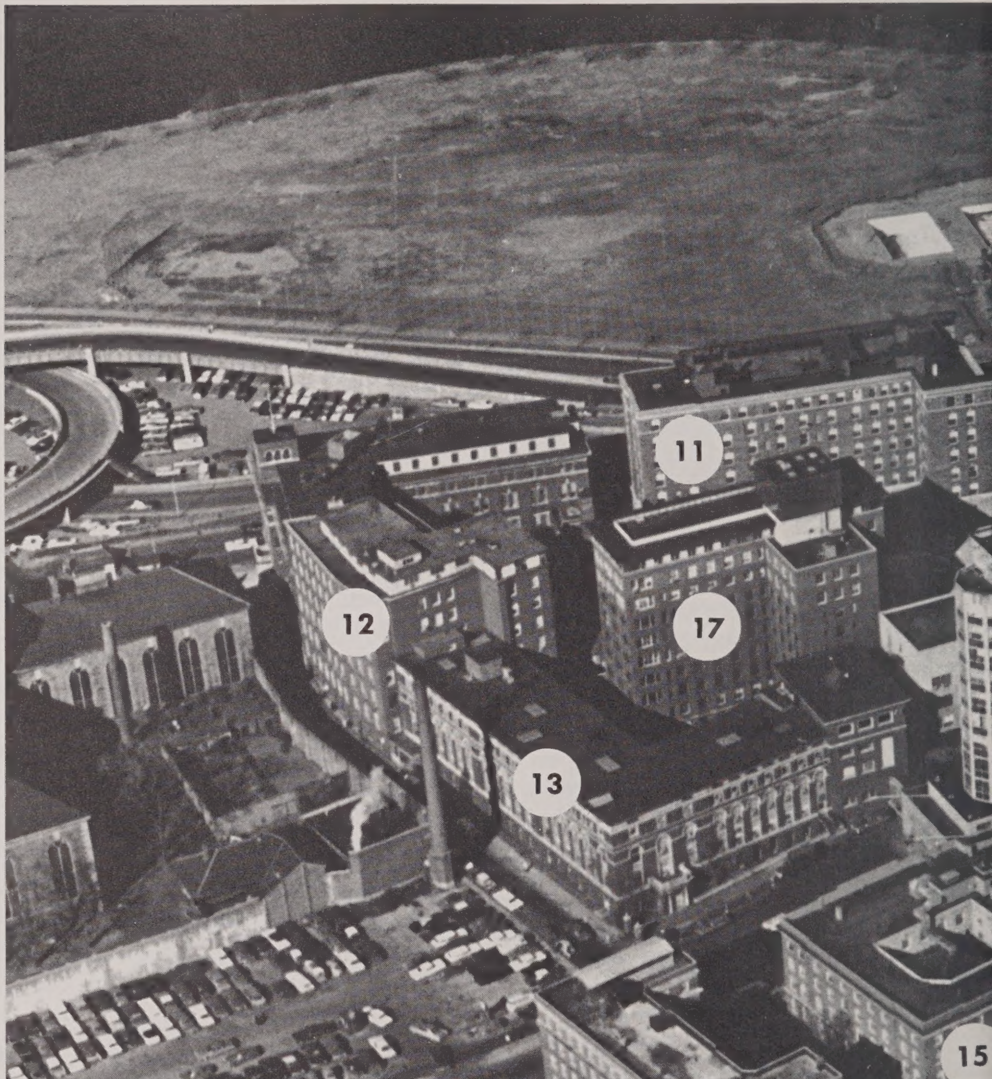
IS THE CHEST PAIN OR DISCOMFORT LOCATED:
   1. IN THE MIDDLE OF YOUR CHEST, UNDER THE BREASTBONE
   2. ON THE LEFT SIDE ONLY
   3. ON THE RIGHT SIDE ONLY
   4. ON BOTH SIDES
 > 1

WHEN YOU HAVE CHEST PAIN OR DISCOMFORT, IS THERE ALSO PAIN:
   1. IN YOUR NECK
   2. IN YOUR LEFT ARM
   3. IN YOUR RIGHT ARM
   4. NONE OF THE ABOVE
 > 4
```

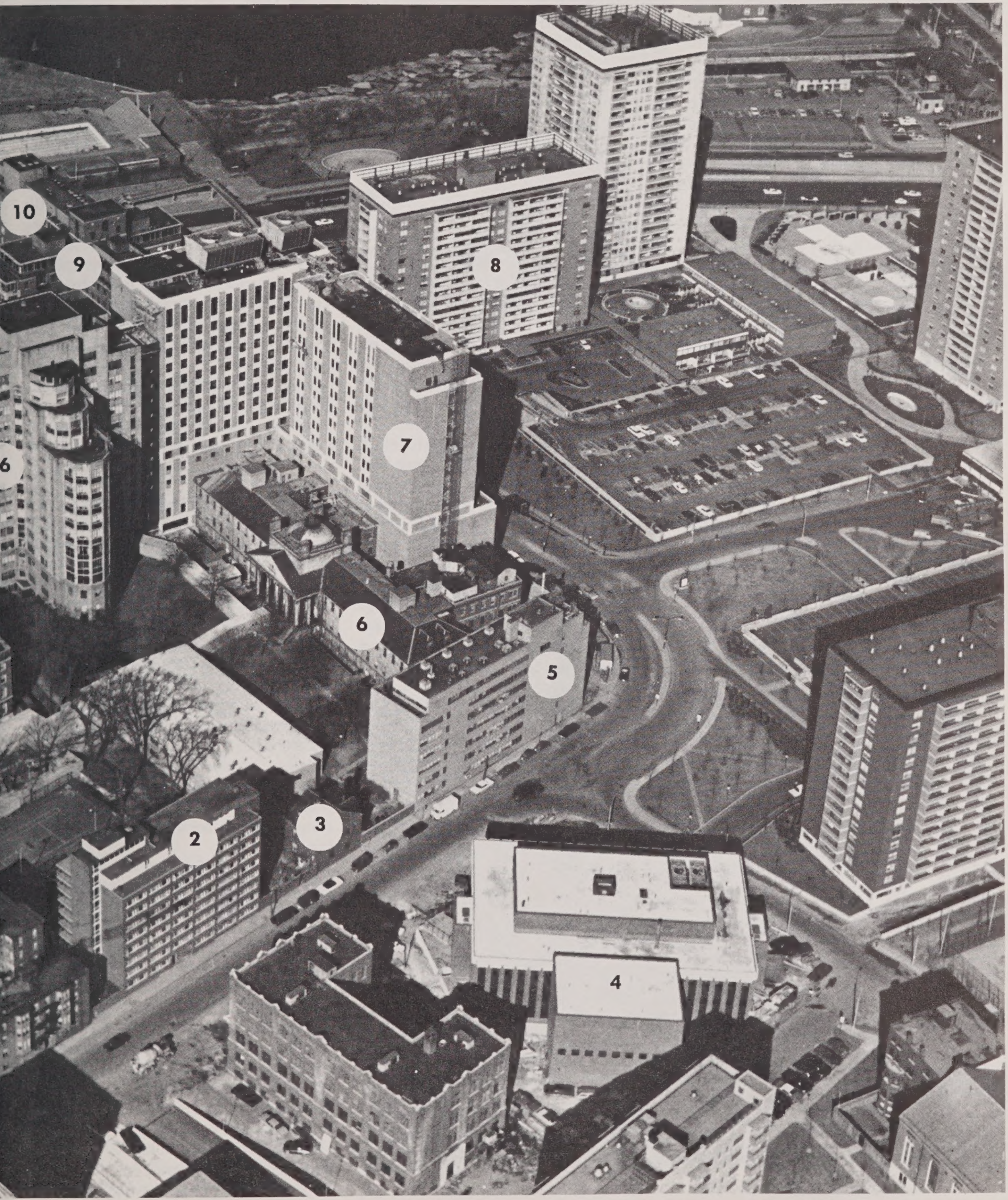
Sample portion of an "interview" between patient and computer-linked teletypewriter. Patient has only to select the right number to answer.

MASSACHUSETTS GENE

On April 23, 1811, Ex-President of the United States John Adams banged the gavel to start the first meeting of the MGH Corporation. Could Adams see this new aerial view of the complex, he might well blink in wonder. The complex has grown from the classic Bulfinch Building (6) in 1821 to the new Surgical and Special Services Building (7). Also a newcomer is the Shriners Burns Institute, Boston Unit (4). Owned and supported wholely by the Shriners, the building will be professionally staffed and operated by the MGH. Other buildings are Sleeper Hall (1), Bartlett Hall (nurses' residence) (2), the old superintendent's building (3), Research Building (5). Zero Emerson Place (8) is not a part of complex but contains a number of private physician offices. Baker Memorial (9), Warren Building (10), Phillips House (11), Massachusetts Eye and Ear Infirmary, affiliated with the MGH (12), Clinics Building (13), Walcott House (14), Moseley Building (15), George Robert White Building (16), and Vincent Memorial Hospital and Burnham Memorial for Children (17).



L COMPLEX–157 YEARS OF GROWTH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Radiologist Pleads for Better Communications

Nuclear medicine specialists and other experts have to learn to communicate much more effectively with each other.

Dr. James L. Quinn III, director of nuclear medicine at Chicago Wesley Memorial Hospital, made that plea in a speech here. The talk was the first annual Aubrey O. Hampton lecture.

Dr. Quinn expressed the need for close teamwork between nuclear medicine men and other medical specialists as well as experts in medical physics and biomedical engineering.

"Cooperative communication is needed," he said in a followup interview, "as contrasted to competitive communication.

"We have to learn to live with each other. There has to be learning with the colleagues on both sides."

Dr. Quinn wants the lines of communication to provide a working dialogue between the physician in nuclear medicine and individuals specializing in various organs and systems of the body:

"The renologist (kidney specialist) knows about renal disease but usually knows little about radioisotope studies. In turn, the nuclear medicine man often does not appreciate the clinical problem enough in renology to know where to place emphasis in research."

Continuing the interview, Dr. Quinn also emphasized a great need for a wedding between the physical scientist and the medical scientist.

The new area of biomedical physics and engineering needs far greater support, he said.

"The physical scientist," he stated, "has always been way out in front. The philosophies are different. One cannot move with the haste with a patient that one can with an inanimate machine.

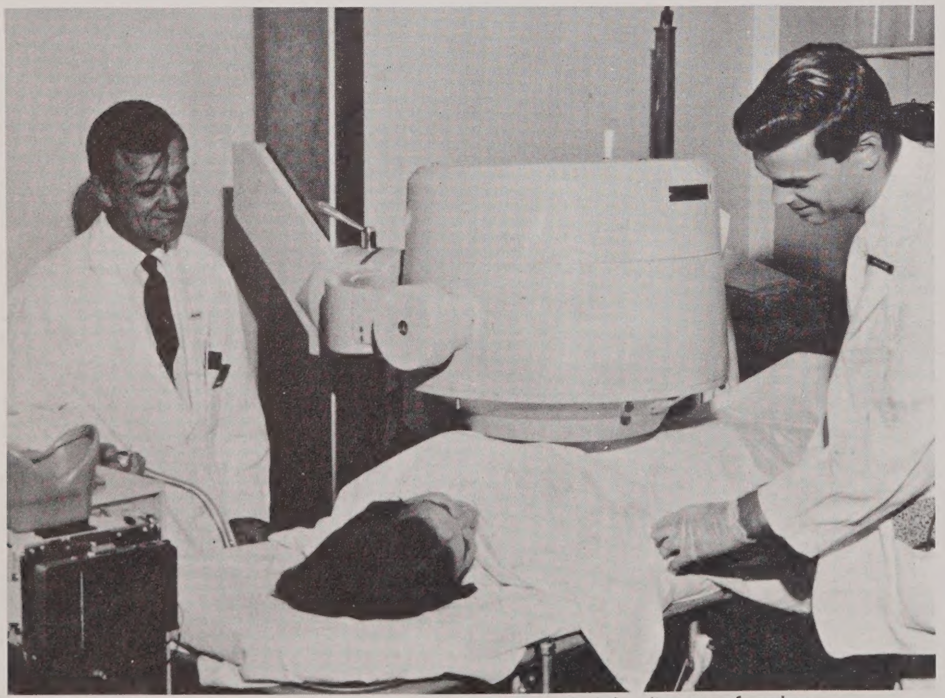
Fresh Approach

"There are some rapidly-growing organizations trying to get the two groups together so that they can better understand each other's needs and problems.

"It is always interesting when you get a fresh new mind on a problem. Oppenheimer (Dr. J. Robert Oppenheimer, father of the A-bomb) used to say there are kids on the street who could solve some of his difficult math problems because of their fresh approach."

Dr. Quinn sees the cooperative spirit as already existing.

"Someone just needs to push them together a little more," he said. "Radiology and physics departments, for example, could have regular meetings presenting problems, trying first to deal in generalities and later getting down to specifics."



Using gamma scanner are Dr. Majic S. Potsaid, left, director of nuclear medicine in radiology department, and Dr. S. Boyd Eaton, a resident in radiology.

Dr. Quinn told of a national meeting which brought together people as far apart in their vocations as physicians and television men.

"The TV men," he said, "were appalled at the lack of sophistication in equipment and terminology among their hospital counterparts. By and large, our level of sophistication in hospitals is below the level in industry.

"Hospitals can get computers for the price of moving them because they are too slow for industry. At the present time, we don't need the speed."

The nuclear medical specialist described the state of the art of scanning. In that procedure, the patient takes a radioactive material that localizes in a given area.

It is much like turning a light on in the part of the body where the material clusters. The scan ends up as areas of light and dark.

Light and Dark

By knowing the normal distribution of light and dark, the physician can determine whether a particular scan is abnormal.

The radiation dose given the patient is very low. Sometimes it is more than an X ray. Other times it is less.

For some diseases, the scan need not be backed up by X ray or other techniques.

Such a study can often provide enough information to diagnose a condition relating to the position of the placenta or afterbirth, associated with pregnancy.

Almost always, however, the physician needs an additional tool such as the X ray.

"The isotope lung scan and roentgenogram (X ray) complement each other," Dr. Quinn said. "Each has advantages and they should be used together and not thought of as one being better than the other."

Dr. Quinn warned his colleagues in nuclear medicine to be circumspect about their tool.

"We can scan just about any organ system in the body," he said. "The brain, the thyroid, liver, spleen, placenta, kidney etc. But should it be done just because it can be?

"That philosophy could lead to some excesses. The challenge for us is to fit it wisely into our armamentarium.

Just because it is a new tool our new approach doesn't necessarily mean it is going to add useful information."

Looking to the future, Dr. Quinn sees another dimension being added to scanning. Most scans are now done with biologically inactive materials.

Active Materials

"In the future," the Chicago doctor said, "we hope to use materials which are themselves metabolized and active. We would use trace quantities.

"They would still not be dangerous. What they would do is add specific information about organ or tissue function."

The use of more specifically localized radioactive drugs combined with more sensitive radiation detectors would advance the state of the art. The combination could provide a more specific diagnosis.

"We're on somewhat of a plateau now," Dr. Quinn said. "We are manipulating techniques, but we are very much in need of finer equipment and a hardware breakthrough."

After Breakthrough

After the breakthrough comes, will scanning ever end the X ray's usefulness?

"No," Dr. Quinn stated. "I think scanning will offer an entirely different capsule of information from the X ray, because the X ray has been structure oriented.

"Nuclear medicine is partly structure oriented, but it will move much more rapidly to dynamic function orientation."

The X ray, then, will mainly be concerned with shape. On the other hand, scanning should be able to show how an organ is working.

Blood Clots

In his lecture itself, Dr. Quinn described nuclear medicine for lung ailment diagnosis.

He said blood clots in the lung (pulmonary emboli) remain the leading cause of death among hospital patients.

"There are often no symptoms," he said. "Close to half the patients with pulmonary emboli have their initial episode outside the hospital.

"The major application of lung scanning today, is still early diagnosis of pulmonary emboli."

Dr. Laurence L. Robbins, chief of radiology, introduced Dr. Quinn, who spoke in the Moseley Rotunda April 24.

DR. AUBREY O. HAMPTON

New Lecture Series Honors Dr. Hampton

The annual lecture inaugurated by the speech of Dr. James L. Quinn III honors one of radiology's most outstanding men.

Dr. Aubrey Otis Hampton died in 1955 after a brilliant career. A pupil of Dr. George W. Holmes at the MGH, he remained here from 1927 until World War II.

He was chief of the department of radiology when he received a leave of absence during the war when he headed the radiological service at Walter Reed Army Hospital.

"He was probably the most rapid thinker in radiology of any man I have ever known," Dr. Laurence L. Robbins said. Dr. Robbins succeeded Dr. Hampton as department chief.

The "American Journal of Radiology" wrote of Dr. Hampton:

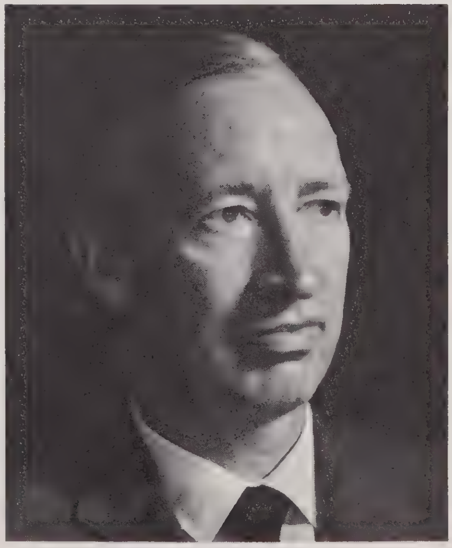
"Dr. Hampton's interest covered all fields of radiology, and he exhibited the same brilliance in each. His diagnoses were usually maintained regardless of opposing arguments, and they had the remarkable quality of almost always being right.

"Although systematic, didactic teaching was something that he abhorred, he was an unusually stimulating instructor.

"The weekly radiological seminar conducted by Drs. Holmes and Hampton at the Massachusetts General Hospital justly deserved its reputation as one of the most valuable teaching sessions for radiologists both young and old in New England.

"Dr. Hampton probably was at his best as a clinical radiologist in the daily routine. He was interested in his patients, and radiology was only part of the picture.

"His unerring ability to see the important aspect of clinical problems was refreshing and exciting even to those who had been with him for years. . . "Hamp" was a man of unusual charm, who made friends easily, and kept them."



DR. PAUL C. ZAMECNIK

Dr. Zamecnik Named To Science Academy

Dr. Paul Charles Zamecnik of the MGH is now a member of the National Academy of Sciences.

He is one of 50 newly-elected members. Academy membership is considered the highest honor that can be accorded a U.S. scientist, aside from the Nobel prize.

In 1956, Dr. Zamecnik succeeded Dr. Joseph C. Aub as director of the J. Collins Warren Laboratories of the Huntington Memorial Hospital and as Collis P. Huntington Professor of Oncologic Medicine at Harvard.

A magna cum laude graduate of Dartmouth College, class of 1933, Dr. Zamecnik holds his M.D. from Harvard Medical School. He interned at University Hospitals in Cleveland and became medical resident and research fellow at Huntington Memorial Hospital, then situated at Harvard Medical School.

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MASSACHUSETTS GENERAL HOSPITAL

CHARLESTOWN PROJECT

(*Continued from Page 1*)

new venture for the MGH and its success will have widespread influence and ramifications."

Dr. Knowles said that teaching hospitals have not deserved to be called health centers.

"In reality," he wrote, "they enjoy a limited and exclusive function as the citadels of acute curative, scientific and technical medicine.

"Medical educators speak of comprehensive medical care as including the preservation of health and the prevention as well as the cure of disease. Continuity of care and home care are stressed.

"Its aims are laudable but are rarely achieved today except for the cure of disease part. As the successes of medical science and medical technology pile up, the subdivision of medical labor increases with its attendant technical competence, discontinuity of care, manpower shortages and high cost."

Bachrach Photo

DR. JOHN H. KNOWLES

By providing truly comprehensive health service in Charlestown, Dr. Knowles hopes the hospital can set a new pattern.

"Inevitably," he wrote, "medicine must concern itself with the larger field of social welfare and develop a holistic concept of a community's health, if it is to prevent disease and maintain health and thereby enhance the quality of life, to say nothing of the national welfare.

"Such a concept will allow medicine to take its rightful place in the larger field of social welfare, and will considerably enhance the learning experience of all health personnel."

New Committee

In another part of his report, Dr. Knowles announced formation of a new committee on teaching and education. Dr. Daniel D. Federman will serve a three-year term as its first chairman.

"I believe that the historians will equate the importance of this innovation with that of the committee on research . . ." Dr. Knowles wrote. That committee has been credited with assuring the MGH of excellence in research.

Formation of the teaching committee was cited by Dr. Knowles as an organizational change to meet social concerns and pressures.

"In this particular instance," he explained, "the problems of shortages of medical manpower and the rationalization of the teaching and educational functions of the MGH demand that a coordinating committee be formed for ongoing scrutiny, review and improvement in our teaching and training functions.

"No longer is our old indentured, apprentice system adequate."

The new committee will meet monthly. Serving on it will be chiefs of service, the general director and appropriate administrative staff, the dean of Harvard Medical School and other representatives from his office, three members of the clinical faculty of the MGH, the director of social service, the director of nursing, an executive secretary, an assistant director for financial affairs, a member of the preclinical faculty at Harvard and three trustees.

Two parts of the general director's report attracted wide attention in the Boston press.

Dr. Knowles lamented the fund cutback in the medical field engendered by the Vietnam war.

"Belt-tightening is a good thing periodically for a country and its institutions," he wrote. ". . . It is mainly the cause of the belt-tightening to which I object."

The other issue attracting attention in the report was the struggle for civil rights.

Pressing Issue

"It is redundant," Dr. Knowles wrote, "to state that the poor and the Negroes of this country suffer the highest incidence of disease of all our people — and Roxbury and Watts as well as Charlestown remain undeveloped countries like Africa, Latin America and Vietnam in this regard.

"The immediate pressing issue for urban hospitals is to be prepared for the sudden demands brought on by civil riots — where anarchists and rioting mobs flow into the hospital with the injured — with the potential for chaos staggering to contemplate.

"The short and long-range issue for this hospital and its 6,000 workers is to speak up, become informed and work diligently and tirelessly, not only for the sick who come to us for help, but for the future of the hospital as it reflects the virtues and strengths of a democracy.

"By participating in the process of democracy and helping to resolve the issues of Vietnam and civil rights, we will strengthen the country, we will strengthen the hospital in the public interest and . . . we will strengthen ourselves."

MGH *News*

Vol. 27 No. 2 MASSACHUSETTS GENERAL HOSPITAL, BOSTON, MASSACHUSETTS July-August, 1968

Feeling Ill? . . . Talk to Television Set at Logan

Stripped to the waist, a muscular young man sat on an examining table in MGH's Logan Airport Medical Station.

"Gee, doc," he said, "I never thought I'd be talking to a TV set."

The face on the television screen before him was split by a grin.

"Well," the television voice replied, "when I was in medical school, I didn't expect to diagnose illness over television either."

The speaker, Dr. Kenneth T. Bird, was seated in front of a television camera in the emergency ward of the MGH, nearly three miles from the airport. He is directing the experimental program which he believes will become a wave of the future.

Reaching to the control panel to his right, he pushed a switch much like the joy stick on an old-model airplane. A remote control camera at Logan swung about the examining room. At Dr. Bird's direction, the camera came to rest once more on the patient.

The 28-year-old man had been struck by a runaway car in an airport accident. A nurse, Miss Marie E. Kerrigan, moved a second camera so that it focused on him.

Now Dr. Bird had two views of the patient on two separate screens before him. Taken from angles 45 degrees apart, the pictures provided the doctor with an added viewing dimension.

"Where does your chest hurt?" Dr. Bird asked.

The man pointed to an area some two inches above his left nipple.

"Put the electronic stethoscope there, Miss Kerrigan," Dr. Bird said. "Mr.___ ___," he said to the patient, "take a deep

Continued on Page 4

Nurse at MGH's Logan Airport Medical Station provides the doctor's hands as physician nearly three miles away at MGH supervises patient examination over television.

MGH Becoming a World Transplant Center

MGH is developing into a world transplant center.

The hospital stands ready to move into four now rare areas of human transplants.

With expanding broad basic research and transplantation linked together in one institution, MGH may prove unique for the scope of its program, Dr. Paul S. Russell said.

Transplant procedures are being readied in four fields: liver, lungs, heart and skin.

A team of surgeons including Drs. Ronald Malt and Robert L. Corry are ready now to perform a liver transplant. Only the right combination of recipient and donor is needed. To date, less than half a dozen liver transplants done anywhere have succeeded for more than a few weeks.

Dr. Malt is encouraged by the success of the procedure here using primates and dogs. Results warrant careful extension of the operation to humans.

Dr. Russell said another team, including Dr. Benjamin A. Barnes, is coming closer to human lung transplants. Only about four have ever been tried anywhere, none successfully. Because of the problems and risks involved, MGH researchers are moving cautiously.

They are making such good progress, however, they are beginning to think in terms of months.

Researchers here are being similarly cautious about human heart transplants. A team, including Dr. W. Gerald Austen, chief of the surgical cardiovascular unit, and Dr. Willard Daggett, has a long period of animal experimentation behind. They too are thinking about human heart transplants in terms of months.

Extensive skin transplants for lethal burns have never before succeeded. Dr. Russell said a team headed by Dr. John F. Burke has achieved interesting early results with guinea pigs. Allowing for the differences between animals and humans, researchers are becoming more optimistic.

"We hope to be able to do human skin transplants within the foreseeable future," Dr. Burke said. Using basic techniques developed at the MGH, Dr. Burke's team believes it will be able to cover as much of the body as needed with skin from another individual.

Until now, many severely burned people have died because they lack enough of their own skin for grafting

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MGH *News*

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EDITORIAL:

Slaying Shows Violence Center Need

Robert Francis Kennedy's assassination has shocked America to examine its conscience once again.

It is ironic that the man who squeezed the trigger was not an American citizen. Despite this, the nation is justified in asking itself what makes violence so commonplace within its borders. Riots in our cities have become almost the norm. Even student protests engender violence. H. Rap Brown — no stranger himself to such topics — said violence is as American as apple pie.

The pity is that he may be right. Even though it is but a small percentage of the people that commits violent acts, our overall record is a disaster. Compared to nations like Great Britain, we are a star-spangled slaughterhouse.

Despite our ability to kill, we have yet to learn much about predicting who is a good candidate for violence. The Oswalds, Whitmans and Specks roam our streets with more freedom than lions in parts of Africa.

President Johnson has recognized our obvious lack of knowledge about the anatomy of violence in appointing a blue-ribbon study commission.

Here at the MGH, research into this area has been going on for some time. The various projects are attacking the problem from both a physiological and psychological basis. There is no clear-cut answer as to the relative roles of the thinking process and biological changes which may alter that process.

So far researchers are uncovering more questions than answers. But from these questions, they hope to be able to decide on a future course. They want to learn what avenues of research are most likely to lead the most quickly to the most basic answers.

One key problem is that to study violence, researchers have to examine violent people. To do so in the open wards of a general hospital, however, is not practical. The people being studied are too likely to go berserk and attack nurses, doctors and other patients. Ideally, a separate facility is in order. A place equipped with the proper research equipment, yet walled off from the rest of the hospital would be required. Specially-trained medical and allied medical personnel could staff such a unit. To set up such a research center would require much money — probably a minimum of $5 million. Only government or private foundation support would make this feasible. Yet the Kennedy assassination again serves to underscore that need.

BOOKS:

The God$_B$ — A Subtle Anthropolatry

By W. Farnsworth Loomis
(N.Y.; October House Inc.,
Publishers, 1967)

Review by N. H. Cassem S.J., M.A. (Experimental Psychology), Ph.L. (Philosophy), M.D.

(Edit. Note: Dr. Loomis was a research fellow in biochemistry at the MGH, 1947–48. Dr. Cassem is a clinical research fellow in psychiatry at the MGH. A Jesuit physician, he is completing studies for a B.D. degree and ordination to the priesthood).

Marshalling his great knowledge and vast experience, Dr. Loomis has given us an articulate history of the origins of the world. With it, he includes his version of the history of the God-construct, which, in his system, has arisen in two stages: God$_A$ and God$_B$. First in this subscript theophany comes God$_A$, who held primacy from 5 million to 40,000 B.C. God$_A$ is what most of us call nature — the blind, unthinking force that made (evolved) man. As soon as the chance hypertrophy of the frontal lobes reached suitable proportions in Cro-Magnon man, the emergence of God$_B$ became possible.

God$_B$, man's creative spirit or endotheistic ethical God in all men, is an activity within man's frontal cortex. Because he has at last been able to lift the seven veils of God$_A$ (mathematics, astronomy, geography, physics, chemistry, biology, medicine), man has now achieved full knowledge of the purely human nature of God$_B$. Religion, then, is simply the relation between men and the gods they have in mind. Therefore, Dr. Loomis details an eloquent plea for "one rational religion," sufficiently universal to promote the

The *MGH News* welcomes letters from its readers. To avoid condensation, letters should be brief. They must be signed and should contain the writer's title or department at the MGH and home address. Names will be withheld on request.

desire in all men's minds to behave as true brothers.

Retention of Notions

The traditional, tough-minded atheist, rejoicing in the reductionist clarity of Loomis' atheistic humanism, will be puzzled at the retention of notions like God, religion and worship. Having stripped the seven veils from man's inventive imagination, he will say, let us drape it for the final de-ectomy. A pseudo-theism is only misleading and will only perpetuate the petty bigotries of organized religion. Equally disconcerted may be traditional theists, among them scientists convinced that their views do not "fight the glorious findings of science."

Having themselves helped to remove the same seven veils of nature, they yet maintain the "comforting illusion" of a God Eternal, Transcendent and Personal, who loved us before we ever thought of him. This is an immense problem, hinging on philosophical and epistemological presuppositions nowhere dealt with or challenged in the book. The addition of charming pictures and the exhortation to grow up will not resolve their basic reservations. For God$_B$ is actually a subtle anthropolatry. To some, the prospect of offering incense to ionic shifts of one's cortical electrolytes or to hippocampal engrams makes even less sense than contemplating one's navel.

However, fine anthropologian that he is, Dr. Loomis correctly underscores the scandalous xenophobic inability of contemporary religions to practice the universal love they preach in a world of men who desperately need international brotherhood. In addition, his work is of stimulating if not catechetical import for theologians formulating a "theology of the secular."

Former MGH Resident Named Birmingham Dean

A former assistant resident psychiatrist at the MGH has been named dean of the Faculty of Medicine and Dentistry at Birmingham University, Birmingham, England.

Professor William H. Trethowan will assume his new duties on Oct. 1. Since 1962, he has been head of the department of psychiatry at Birmingham.

While at the MGH after World War II, Prof. Trethowan was an honorary teaching fellow at Harvard.

DR. THOMAS DURANT

Things Like That Happen Over There

An American medical team had just vaccinated a Vietnamese village for typhoid.

Tramping back on the dusty road, they ran into another medical team.

"Where you guys headed?" a tall thin man in the returning group shouted.

"We're going to vaccinate the village against typhoid," came the retort.

Before the week ended, four other teams from different agencies descended on the village of 6,000, all to vaccinate residents.

"So many things like that happen over there," Dr. Thomas Durant said. "So you see the problem of coordination is universal."

New Assistant

The short, bouncy physician was speaking from his MGH office in White 14. He is the hospital's new assistant director.

After 21 months as chief public health officer in Saigon for the Agency for International Development (AID), he is bursting with thoughts about Vietnam.

Increased fighting now, Dr. Durant said, is making sorely needed medical reforms increasingly difficult.

"With the delay in getting peace there are more and more refugees. It is just a horrendous problem. It is compounding all the problems that existed before."

Solution Agrees

Dr. Durant's solution agrees with the policy Massachusetts Sen. Edward M. Kennedy advocates for Vietnamese problems in general.

"Increase the Vietnamese responsibility and gradually decrease the American responsibility. We have been displacing rather than increasing Vietnamese responsibility."

Dr. Durant recommends implementation of study reports made by groups including MGH men. In the more recent, Dr. H. Thomas Ballantine Jr., visiting neurosurgeon here, and Lyman Brewer, a Los Angeles surgeon, represented the American College of Surgeons.

They toured Vietnam last December. In their report, they recommended abandonment of the present policy of drafting American non-surgical residents and putting them in inadequate Vietnam facilities. These young physicians have been replacing Vietnamese doctors.

Instead, Dr. Ballantine and his colleague recommend sending teaching teams into Vietnamese hospitals to train the doctors of that country in surgery and anesthesiology.

Long-Term Problem

Dr. Ballantine regards the problem as a long-term one which entails overcoming the inertia of the American government.

In the second study, Dr. John H. Knowles, general director of MGH, was part of a medical team representing the American government. One of their

Continued on Page 11

FEELING ILL ?

(Continued from Page 1)

breath when I raise my right hand."

A creak sounded in the electronic stethoscope in the television diagnostic room at MGH.

"Bruit de cuir neuf," Dr. Bird said. "A typical friction rub from pleurisy. Not serious. Miss Kerrigan, lower the stethoscope so that I can listen to the heart."

Lub-Dub

A rhythmical lub-dub sound came again and again to the MGH room.

"Good," Dr. Bird said. He had the nurse take an electrocardiogram. The tracing of the heart's electrical impulses appeared immediately in the MGH room.

Another instrument called a phonocardiograph showed little white blips dancing across a screen. Had he wanted to, Dr. Bird could have photographed these with a Polaroid camera for a nearly instant record.

During the course of the examination, the patient confided in Dr. Bird that he had been tired of late.

Elastic Binder

Dr. Bird instructed the nurse to apply an elastic binder to the patient's chest to provide support. On a pad to his right, he wrote out a prescription. The data appeared on a prescription blank near the patient in the airport medical station.

The examination had included a blood pressure which recorded at the MGH emergency room. "Had it been necessary," Dr. Bird said, "I could have asked for any number of laboratory tests."

He had Norman Lemieux, the project's electronic technician, focus another television camera on a microscope with the slide of a patient's blood sample. The blood cells appeared on a screen at the MGH room.

"That blood smear is magnified 1,000 times and projected over the air," Dr. Bird said, pointing out various cells, extremely clear despite the magnification and projection.

Whir of Jet

As he spoke, the whir of a jet engine revving up at Logan roared in the background.

"This system," he said, "evolved because of the growing shortage of doctors. It provides interim medical direction."

Dr. Kenneth Bird, at diagnostic room at MGH, operates "joy stick" control which maneuvers remote-control camera at Logan Airport Medical Station.

The seven nurse clinicians who staff the Logan station around the clock are trained to make some of the simpler decisions ordinarily left to a physician.

Because of the doctor shortage, physicians man the station only at peak hours. With the tele-diagnosis system, however, the nurse now knows she has an instant backup for more serious cases.

A telephone call, a page on the hospital telephone or by a beeper the doctor carries in his pocket — any of these means — can summon the physician to the television room at the MGH.

Experimental Program

Since the program is still experimental, however, one physician is manning the TV diagnostic room eight hours a day.

The nurse derives another large benefit. When the doctor listens to a patient's heart beat or breathing, she hears them too.

"This will increase her knowledge as she gets used to the sounds and the doc's interpretation," Dr. Bird said. "It's a marvelous teaching device."

After nearly a year of installation, the system received its trial run on April 12. That was coincidentally seven years to the day after another scientific landmark — Yuri Gagarin's first orbital flight.

Dr. Bird initiated the television project, designed by Richard Oldham, assistant director of the education division of WGBH, Boston's educational station.

Like Being There

On June 1, the MGH started actual use of the system on an occasional basis. With the aid of the two cameras at different angles, Dr. Bird diagnosed the first case as bursitis of the knee region. The first patient's reaction?

"Doc, it's just as if you were here," he said. Later, without realizing what she was saying, the nurse at Logan asked Dr. Bird at the MGH:

"As long as you are here, would you see another patient for me?" That matter of fact approach from the nurses plus the confidential conversation between patient and television screen makes Dr. Bird confident.

"That's why I'm sure it's going to work," he said.

But the new medical media is not by itself the thing.

Tone of Voice

"The doc," Dr. Bird said, "has to be willing to try to establish relations with the patient. His tone of voice, the expression on his face, his mannerisms, are all important.

"He has to convince the patient that the doctor is just as interested in talking to him as if the doc were in the same room. Looking at the camera, for example, makes the patient feel that the doctor is looking right at him."

Properly used, tele-diagnosis can extend the eyes and ears of the doctor and through the nurse at the patient's side, his hands.

"This system also needs understanding nurses," Dr. Bird said. "There has to be a strong team effort.

". . . One of the big problems is to get the doctor to realize all the things that can be done."

Use of Specialists

In the case of the Logan-MGH system, this can even now make consultations possible. The services of any specialist in the huge complex can come into play on a moment's notice.

A tele-diagnosis physician at the MGH diagnostic room might, for example, want a specialist's opinion about a heart murmur.

With a telephone call, he could summon a heart specialist (cardiologist) from the same building.

Instead of bucking the traffic to

Logan, the cardiologist would require only a round trip by elevator.

Screening Tests

Another plan for the present system is to provide screening tests. For example, nurses at the airport can and already have given a simple breathing test to large numbers of patients.

Those who seem to have some sign of disease should have a physician repeat the test. If told to return when a doctor is there, many persons never would.

But summoning a physician to the MGH emergency room would solve that problem. The physician could either relieve the patient's anxiety on the spot or provide a diagnosis and perhaps initiate treatment.

Another such screening test planned is for the eye disease glaucoma.

Non-Medical Uses

Even non-medical uses of the system are already in operation. Miss Edna S. Lepper, RN, director of the MGH nursing service, has been taking weekly nursing reports from the Logan station by television.

Miss Eleanor Clark, director of social service, is planning to have social workers use the system to take case histories from patients at Logan.

Miss Mary Regan, in charge of in-service nursing education, is setting up in-service training programs for the Logan nurses. Tele-diagnosis will beam those programs.

Dr. Bird has tested the educational possibilities by using the system to lecture to Harvard School of Public Health students on occupational lung disease. The class was one of those of Dr. Raymond L. H. Murphy Jr., who is also project coordinator for tele-diagnosis.

Once the system is established, first aid courses can be given to state police at Logan.

Pilot Study

Right now, the system is in its first year of a three-year pilot study. The U.S. Public Health Service has provided a $315,000 grant. Of this, $157,000 is for first-year use. Changes are expected to take place as Dr. Bird on the medical side and WGBH on the communication side learn more about the problems and the potentials.

The program is a pilot study for the entire country. Dr. Bird expects the next phase to include color television. That would provide another dimension to aid diagnosis.

"Within a couple of years," Dr. Bird said, "I can see any peripheral hospital within microwave distance joining a tele-diagnosis network. Using Telstar and Early Bird (satellites), you can have any number of community hospitals tied in.

Burned Child

"Take a child with a total body burn. A specialist at a teaching hospital could 'see' him at the community hospital without leaving his own institution.

"That sort of thing could save a busy specialist or team of specialists hours of traveling time. That way they could see many patients in the time it now takes to see one."

Even more into the future, Dr. Bird envisions a time when a physician in his office could examine a hospital patient.

"Tele-diagnosis," he said, "I visualize as part of a much greater system of tele-medicine. Tele-medicine would provide a large variety of services from a distant physician.

"It just depends on what happens to the cost of the equipment. Initial instrumentation cost $80,000. That cost will keep going down."

Emergency Room Becomes TV Station

Tele-diagnosis has turned a small MGH emergency-ward room into a television control station. It was designed by Richard Oldham, assistant director of the educational division of WGBH, Boston's non-commercial television station.

A TV cable leads from that room to a transmitter room on the 14th floor of the White Building. Atop the building, towering 217 feet above North Grove Street rises a 4-foot microwave antenna.

Signals beamed from the hospital strike a 4 by 6-foot reflecting antenna on top of the control tower at Logan Airport. From there, the signal descends to a room in MGH's Logan Airport Medical Station.

The picture of the physician in the White Building TV room then appears on a screen at Logan for the patient to see.

Since special equipment is required to pick up the signal, home television viewers are unable to receive the closed circuit telecasts. That keeps the examination as confidential as if the patient were in the doctor's private office.

The $80,000 worth of equipment includes sensor devices manufactured by Gulton Industries Inc. and is the most sophisticated available for black and white transmissions.

Special tubes in the three television cameras respond to the overall lighting.

The aim is to make the equipment intrude as little as possible on the doctor-patient relationship. Modeling lights installed in the walls will help make this possible.

Even a camera aimed at the examining room at Logan will be hidden behind a two-way mirror.

A special lens imported from Japan will automatically zoom that same camera in for closeups. Operated by the physician in the MGH television room, that camera responds instantly to controls there.

A nurse operates a second camera at Logan and a third one is focused on the physician at MGH.

Starting July 1, Dr. George Cohen, a fellow in medicine at the MGH, has been that diagnostic room physician eight hours each day.

The two-way microwave system, installed by Raytheon under Oldham's direction, operates on 12,500 megacycles.

Two Physicians at MGH Win Advanced Fellowships

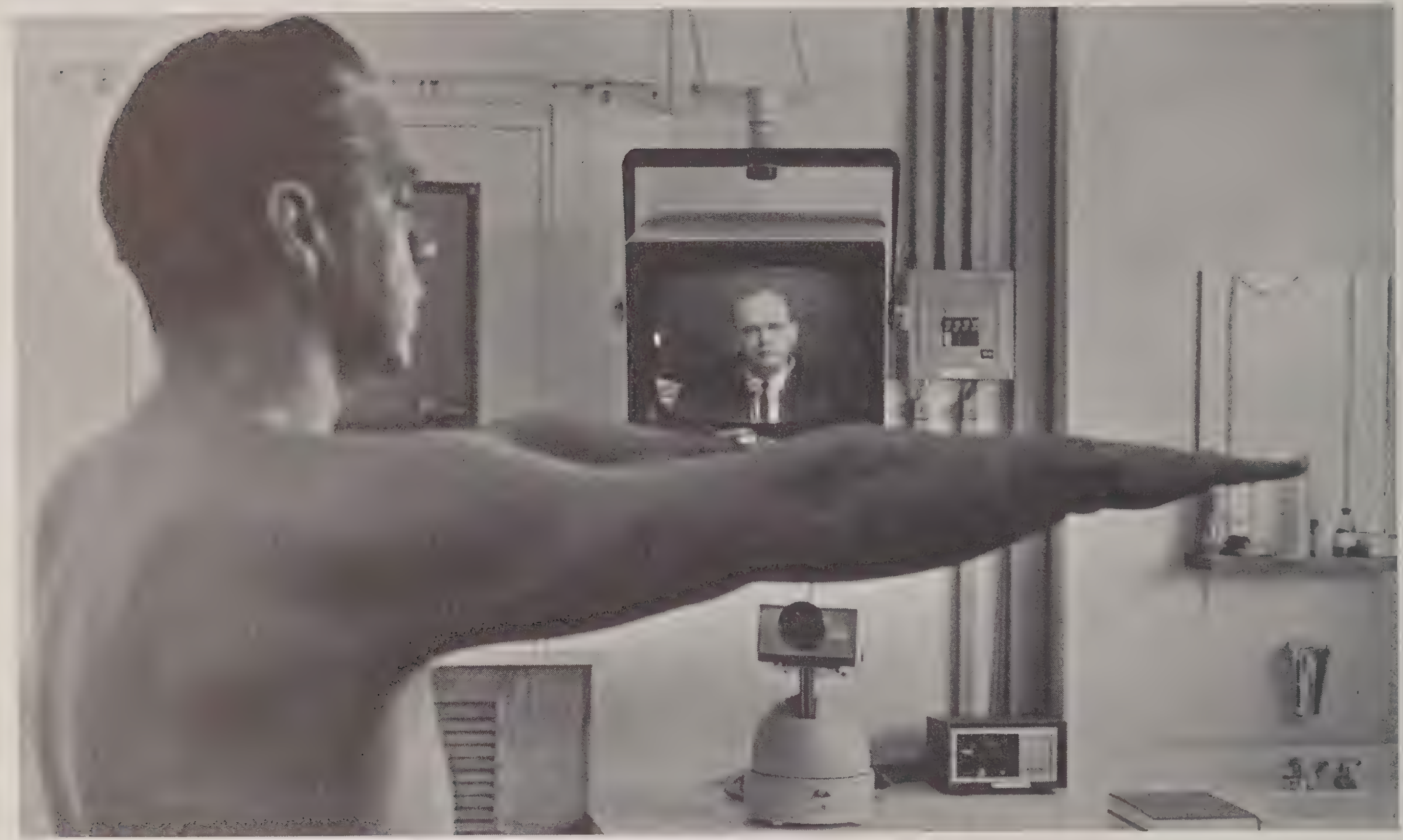
Physicians associated with the MGH have won two of the four national advanced fellowships in academic radiology.

The National Research Council announced the awards on behalf of the James Picker Foundation. One of the MGH winners is Dr. Reginald E. Greene. He will work here under the guidance of Drs. Laurence L. Robbins and Homayoun Kazemi and later at the Postgraduate Medical School in London with Dr. J. B. West.

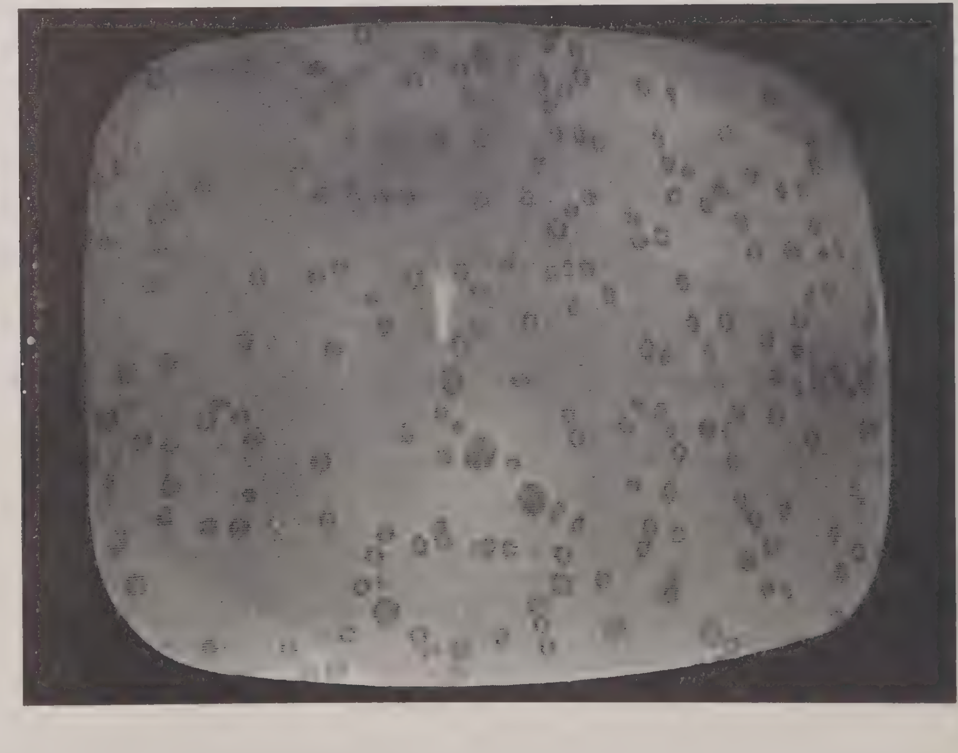
Dr. Gerald M. Kolodny of Cambridge was named to begin his third year as an advanced fellow. He will continue his studies at MIT where he is working towards a Ph.D. degree in biophysics. At the same time he is developing his radiological teaching skills at the MGH. He is working under the guidance of Dr. Robbins and Prof. Paul R. Gross of MIT.

MGH physicians have now won three of the 15 advanced fellowships in academic radiology since the awards began.

TELE-DIAGNOSIS . . . T

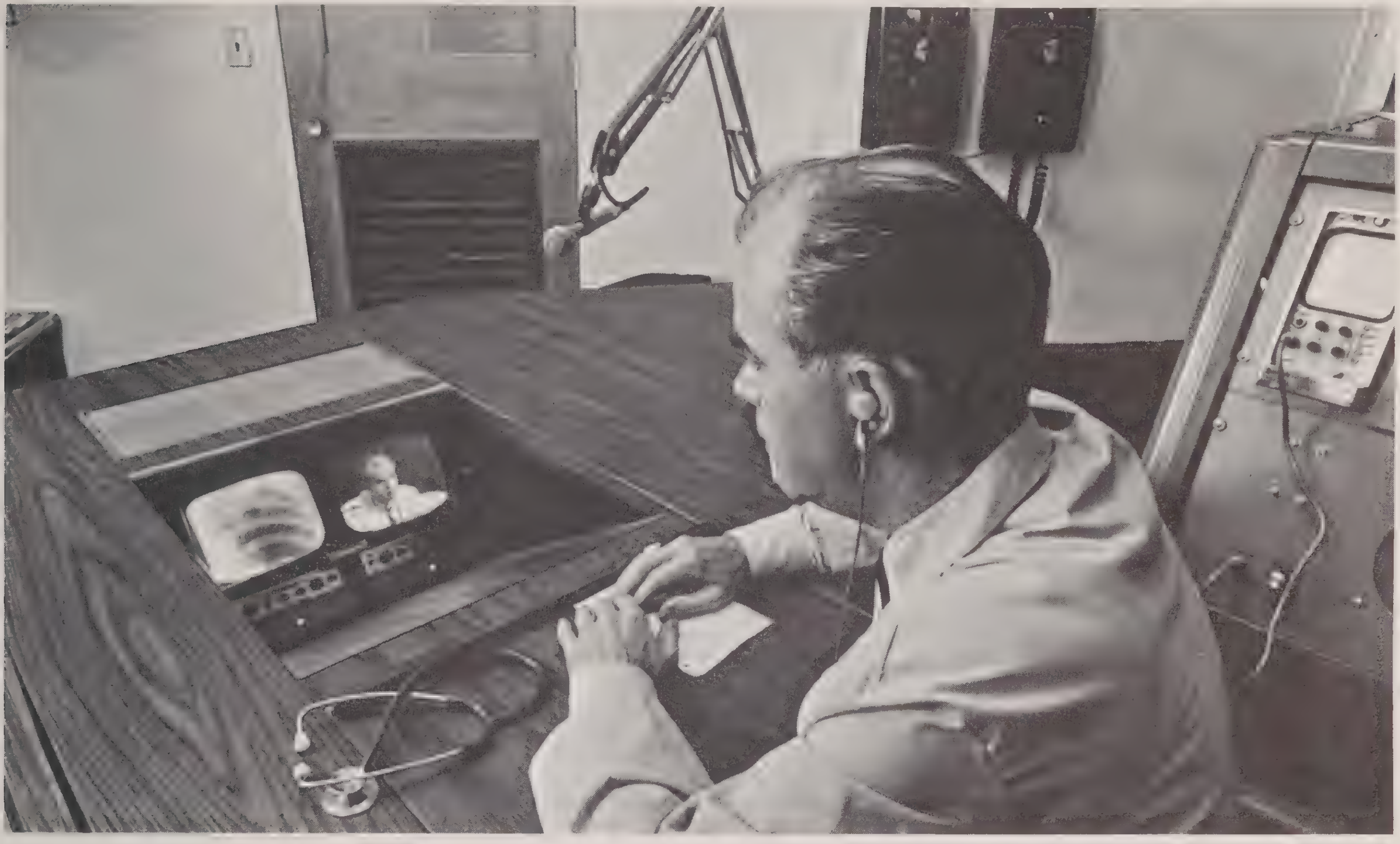


Airport employee demonstrates muscle coordination test at Logan as Dr. Raymond L. H. Murphy Jr., project coordinator, supervises from MGH diagnostic room. Below Dr. Murphy's TV screen image is remote-control camera operated from diagnostic room nearly 3 miles away.



Blood smear with cells magnified 1,000 times is projected from Logan to MGH.

morrow's Medicine Today



Dr. Kenneth Bird, seated at the television controls at the MGH diagnostic room, examines chest X-ray (TV screen on left) being flashed from Logan Airport Medical Station. On monitor screen at right appears Dr. Bird's picture. Screen on left can be used to show various diagnostic tests as well as patient at Logan Airport.

Dr. Bird at MGH examining instruments recording pulse, breathing rate, heart electric impulses etc. of patient at Logan.

Rehabilitation Service: A Major Change

The MGH has combined its entire rehabilitation service into one major department.

The sweeping change centralizes all the previously scattered rehabilitation activities. At the same time, it will make possible a much greater team approach and the training of superspecialists.

"The change will tremendously stimulate the entire program," Dr. Donald S. Pierce said. "One department can do a lot more than three or four decentralized segments."

Dr. Pierce is chief of the new department of rehabilitation medicine. Until now, he was director of the rehabilitation unit on White 9.

That unit was separate from the physical medicine department on Vincent 1, the brace shop and the amputee clinic. Now all are combined in the new department.

Dr. Arthur L. Watkins, chief of the physical medicine department, retired as of May 30 to take charge of physical medicine at the Crotched Mountain Rehabilitation Center in Greenfield, N. H.

Full Impact

From an administrative viewpoint, the new department is already a fact. The full impact, however, will be felt when a rehabilitation section opens in the new Surgical and Special Services Building.

That section will probably be situated on the ninth floor. A corridor will link it to White 9. Other sites are also under review.

"We will have all the latest equipment for physical treatment," Dr. Pierce said. "We will be able eventually to develop specialization within physical and occupational therapy.

"Some will be trained to specialize say in therapy for hip patients, others for back patients, etc."

Dr. Pierce is especially pleased that the change will allow a greater team effort. Like many branches of medicine, rehabilitation requires a number of specialists — probably more than most fields.

Part of the team includes occupational, physical and speech therapists, rehabilitation nurses, social service, orthopedic surgeons and internists. Backing them up are experts from other services in the hospital brought in on a consultative basis.

Spinal Cord

White 9 will house modern nursing units and possibly a special model area for treatment of spinal cord injuries. Until now, the patients needing intensive rehabilitation have occupied the 36-bed inpatient unit on White 9. With the opening of the new section, it would be possible to expand the number of beds if the community and staff need them.

The new section (North 9) will have a much larger area for physical and occupational therapy. Capital financing remains a problem, however, and the time schedule is not set.

For the time being, a section of the rehabilitation service will remain on Vincent 1. That unit does physical and occupational therapy on a consultative basis for patients throughout the entire hospital. They remain in whatever part of the complex that referred them, except while being treated briefly each day at Vincent 1.

In addition, that service handles the evaluation and training for people sent by the Industrial Accident and Rehabilitation Board. Once North 9 becomes a reality, the Vincent unit will move up there.

Between North 9 and White 9, the rehabilitation area will include some 30,000 square feet.

Ambulatory Clinic

Another feature of the new building will be an ambulatory rehabilitation clinic on Gray 1. That clinic will be designed especially for patients with gait problems. There members of the new department of rehabilitation medicine will teach those patients to walk.

Next door will lie the new brace shop.

"Brace service will be available right on the spot," Dr. Pierce said. By locating the brace shop and ambulatory clinic on the first floor, ambulatory patients will be spared having to get to the ninth.

To continue care after inpatients leave, the new rehabilitation medicine department plans to coordinate efforts with nursing homes and extended-care facilities working with the MGH.

"We hope to have a close relationship with at least six extended-care facilities and nursing homes eventually," Dr. Pierce said. "Then we could take any patient from an extended-care facility for treatment here and then send him back there or back home. Or we could treat a patient here initially and send him for a while to an extended-care facility."

DR. DONALD S. PIERCE

Mass. Medical Society Elects Two MGH Doctors

Two MGH physicians have been elected to office in the Massachusetts Medical Society.

Dr. H. Thomas Ballantine Jr. was voted vice president and Dr. F. Thomas Gephart was re-elected secretary. Visiting neurosurgeon at the MGH and assistant clinical professor of surgery at Harvard Medical School, Dr. Ballantine is slated to move up to president elect next May.

A visiting surgeon at the MGH, Dr. Gephart is clinical associate in surgery at Harvard Medical School. Dr. John W. Norcross of Lahey Clinic was elected president, succeeding Dr. Donald A. Nickerson.

Experimental device that electrically stimulates patient's weakened muscles.

Muscle Stimulator Holds Much Promise

An experimental device that electrically stimulates muscles holds tremendous promise for large numbers of patients.

Its MGH developer, Dr. Donald S. Pierce, has tried it successfully here on about 10 persons over about six months. Its use with patients previously unreported, the device is being used on persons with spinal cord injuries, those who have had strokes and others with peripheral nerve injuries.

Dr. Pierce uses the machine to stimulate muscles in patients at a time when illness or injury keeps them from exercising with their own weak muscles.

"In these people," he said, "there is some strengthening of muscle and a measurable increase in the size of the muscle, and in its electrical output."

With the device, the muscle is stimulated to produce 50 to 70 per cent of normal capacity for work or exercise. Dr. Pierce even hopes to use his apparatus to exercise a muscle encased in a splint.

Another possibility is an electrical arm to pick up things.

Nearly Pain Free

Other similar devices exist. What makes this one different is:

1. It is nearly pain free for patients.
2. It does not irritate the skin.
3. It provides much more muscle stimulation.

Dr. Pierce calls his device an electric biological function generator. It makes possible changes in the place where the maximum amount of stimulus occurs.

Energy rise is slightly slower than usual and has a prolonged fall. This matches the way in which nature interferes with the flow of electrical current through tissue and it is thought results in the nearly painless aspect of the stimulus.

Strictly Experimental

"Other stimulators produce only a weak muscle contraction or severe pain," Dr. Pierce said. He emphasized that his own device is strictly experimental. But of its potential, he said:

"If you include the large stroke population, there is a tremendous number of people who could be benefited to a greater or lesser extent."

With the aid of an engineer, Dr. Pierce developed the stimulator while teaching at the University of California at San Francisco. He continued working on it when he came to the MGH in 1965.

Chief of the new department of rehabilitation medicine here, he described the device in May at the First Rehabilitation Conference sponsored by the Committee on Orthopedic Rehabilitation of the American Academy of Orthopaedic Surgeons.

"It is extremely low cost to reproduce," he said in a followup interview. "It takes a simple laboratory stimulator with a very inexpensive addition that can be built by any electrical shop for the shaping of the waves."

Similar Techniques Ease Muscle Spasm

Techniques that could relieve muscle spasm for large numbers of patients were described at a Boston meeting.

The First Rehabilitation Conference was held at MIT and the MGH. Sponsored by the committee on orthopedic rehabilitation of the American Academy of Orthopaedic Surgeons, the previously unreported sessions were conducted in May in conjunction with Harvard Medical School, MIT and the MGH.

The procedures described are used to provide long-term relief for muscle spasms. Persons who have suffered strokes and cerebral palsy are among those who can be helped.

"About 40 per cent of the stroke patients in the country may be helped by one or the other technique," Dr. Donald S. Pierce said. Dr. Pierce is chief of the Department of Rehabilitation at the MGH where both methods are being used.

The techniques are called closed and open dilute phenol block. In both, phenol, a compound distilled from coal tar, is injected around the patient's problem nerve. The method of injecting differs.

Closed Technique

In the older or closed technique, the surgeon injects the phenol through the skin around a nerve. Because nothing is exposed, he has to settle for infiltrating the area around the nerve.

The open technique is both more selective and more extensive. It involves surgery to expose the motor nerve branches. With them in full view, the surgeon can inject the phenol into the motor nerve alone, the one through which the spasm is mediated.

Describing the open technique to the conference was Dr. Vert Mooney, chief of the stroke service at Rancho Los Amigos Hospital in Downey, Calif. Dr. Mooney pioneered the procedure.

At least six months after the operation, 80 per cent of 50 patients operated upon still felt their arm looser. Only half actually tested looser.

The change seems permanent for about half the improved cases.

Open Block

"The MGH is using the open block more and more," Dr. Pierce said. "We're much happier with the open method."

Continued on Page 11

A Real Danger for Which Most Drug Addicts Don't Bargain

Two MGH experts warn that drug addicts are endangering their health in a way most do not suspect.

Liver inflammation (hepatitis) from use of narcotics is becoming disturbingly common, Drs. Kurt J. Isselbacher and Raymond S. Koff told the *News*.

"Much like our society is changed," Dr. Isselbacher said, "the background of hepatitis has changed so we are seeing a significant number of patients with non-oral transmission of hepatitis. . . . Ten years ago the number of people with narcotics-related hepatitis was small."

"The people we are seeing now," Dr. Koff added, "are younger and from all economic classes. Most are taking amphetamines" (drugs that among other effects stimulate the central nervous system).

The two doctors listed two ways the addicts are probably endangering their livers.

"One problem," Dr. Isselbacher said, "is the passing of a hypodermic needle from one user to another."

Seldom does the addict take the pains to at least boil the community needle. As a result one person with hepatitis passes it on to his friend.

A Los Angeles study has pointed out the possibility of a second danger. Drugs made by amateurs in their kitchens may contain impurities capable of damaging the liver.

"Our emergency ward, I am told, on the average sees six to seven cases of narcotics-related hepatitis each week," Dr. Isselbacher said.

Dr. Koff said Los Angeles County Hospital has been admitting two or three such cases a day.

"Given the frequency of drug use in the population," Dr. Isselbacher said, "it is clear that this has to be a significant disease."

In a study at Tooting Bec Hospital in London, only three of 51 addicts with hepatitis denied sharing a needle.

"I don't think the youngsters are aware of the danger of sharing a needle," Dr. Koff said. "Whenever you have a disease with a long incubation period, you are not going to get sick in a day. In this case, it may be a month or two after using the needle."

The illness varies in severity from one patient to another.

In severe cases, hepatic coma and even death can result. For others, the illness may prove mild.

"The problem of syringe-transmitted hepatitis," Dr. Isselbacher said, "is of such a magnitude one has to call it to the attention of the physician."

Drs. Koff and Isselbacher have done just that in a medical progress article in the June 20 issue of the "New England Journal of Medicine." One section of the article states:

"The public health implications of increased parenteral (non oral) drug use have not been adequately emphasized. Since drug users may often sell their blood to commercial blood banks in order to obtain money for drugs, it is clear that such blood sources may represent a significant hazard of viral hepatitis for the recipient."

In the *News* interview, Dr. Isselbacher warned physicians that addicts may be reluctant to admit they have been either taking drugs or using a common needle.

"I think we have enough experience," he said, "to know we have to view denials about narcotics with skepticism."

"Perhaps the patients don't talk because they have a lot of friends at stake. What is the doctor's role if he finds out where the drugs are coming from?

"Theoretically, it is privileged information. Should the physician be silent and let someone continue to supply the narcotics? Or should he violate the patient's confidence? I don't know the answer."

Dr. Isselbacher said the approach to narcotics-involved hepatitis has to be largely preventive rather than therapeutic. Treatment, however, is not being ignored.

"We are engaged in comprehensive studies of liver injury here," Dr. Isselbacher said. "We are concerned with the causes and mechanisms and treatment."

The studies are being supported by a three-year $287,661 grant from the John A. Hartford Foundation, Inc., of New York City. Effective July 1, the grant continues a research project begun in 1963 with Hartford Foundation support.

Dr. Isselbacher, chief of the MGH gastrointestinal unit and professor of medicine at Harvard Medical School, has headed the research since 1963. A clinical and research fellow at the MGH, Dr. Koff is principal author of the "New England Journal" article.

In his Hartford Foundation project, Dr. Isselbacher plans to apply some of his basic observations on the liver to the treatment of patients with fatty liver and hepatic coma.

Other areas dealing with liver injury and its prevention and treatment in the Hartford Foundation study include hepatitis and cirrhosis (an ailment involving progressive destruction of liver cells), hepatic coma and acute fatty liver, and coma of childhood.

Drug addicts sharing a needle are endangering their health in a way most do not realize.

Structure Services!

"Any modern urban hospital worthy of the name should structure rehabilitation services," according to Dr. John H. Knowles.

The MGH general director made his comment at the First Rehabilitation Conference of the American Academy of Orthopaedic Surgeons.

He told a session in Cambridge that the problem is how to organize a rehabilitation service within a general hospital. He recommended that such a service should:

Four Suggestions

1. Be centralized as a department with defined location and well defined balanced functions. These functions would include care, teaching and training, research and active extensions to the community.
2. Only be interested in the complete and comprehensive care of the whole patient.
3. Include teaching and training for specialists.
4. Centralize the department while simultaneously decentralizing its services.

"Orthopedics, psychiatry, internal medicine, neurology and social service," Dr. Knowles said, "are particularly relevant in relation to the whole hospital, both as a team and/or active consultants, but all hospital interests are important here."

Annual MGH Course Set For Volunteer Directors

MGH's annual four-week course for directors of hospital volunteer services will be held from Sept. 23 through Oct. 18.

Staff members under the direction of Mary Ruth Wolf, director of the Volunteer Department, will conduct the unique course. Classes involving all 175 hours of study will be held in the hospital.

Upon satisfactory completion, participants will receive certificates. Certified graduates include two from South America and one from Canada.

Those taking part will study the complexities of hospital organization and management and the place of the volunteer department in the total hospital structure. To allow for a maximum of individual attention, enrollment is limited to six students.

Ambulance service to MGH was a little slower when this picture was snapped in 1888. But the traffic then wasn't too bad.

THINGS LIKE THAT HAPPEN

(Continued from Page 3)

major recommendations made nearly a year ago was to emphasize preventive medicine.

Of this, Dr. Durant said:

"The refugees are increasing the threat of communicable disease. The emphasis should be on public health nurses and public health training rather than continuing to send American nurses who have done only staff duty here to merely displace the Vietnamese nurse and not increase the capability."

Dr. Durant stressed that diseases like malaria, cholera and tuberculosis are leading threats. Tuberculosis is still the leading cause of adult death in Vietnam.

Preventable Diseases

Diseases that can be prevented — ills like diphtheria, whooping cough and complications of measles — still take a huge toll in children's lives.

Another recommendation Dr. Durant stressed is the use of Vietnamese military hospitals for civilian casualties.

"Both these reports were made a long time ago," he said, "but there has been very little implementation."

In his new job here as assistant director, Dr. Durant will assume some of the duties of Dr. Charles L. Clay, another assistant director. In addition, Dr. Durant will take charge of regional medical planning.

He is the executive secretary of the new committee on teaching and education.

DR. DREYFUSS ELECTED

Dr. Jack R. Dreyfuss has been elected president of the New England Roentgen Ray Society. He is assistant clinical professor of radiology at Harvard Medical School and radiologist at the MGH.

SIMILAR TECHNIQUES

(Continued from Page 9)

While a less extensive procedure, the closed block's effect lasts only from three to six months on smaller nerves. Dr. Pierce advised against using it on larger ones. On them, the effect lasts only about three weeks.

Both Dr. Pierce and Dr. Mooney also cautioned against multiple repetitions of either procedure if the effect wears off.

"Phenol is carbolic acid," Dr. Mooney said, "and extremely destructive in larger quantities."

When used carefully, however, the procedures are safe. In 220 closed blocks at the MGH between June of 1966 and last April, physicians have seen no damage to adjacent vessels.

Both techniques reduce pain and increase motion. For those reasons, they make it possible to begin physical and occupational therapy where spasm made it impossible or of little use before.

Neither the open nor the closed block can help in every type and degree of spasticity. They are, however, considered valuable additional tools for the surgeon's chest.

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MGH TRANSPLANT CENTER

(Continued from Page 1)

and they have been subject to infection.

Dr. Burke hopes to get transplant skin from families of burn victims. The problem in grafting skin from one person to another is essentially the same involved in almost any kind of transplant. After a varying but brief period, the body tends to reject any tissue not its own.

With identical twins, this proves no difficulty. Scientists have devised two techniques that lessen the hazards for non-twins.

Dr. Russell has supervised the MGH projects which contributed much of the world's knowledge about the two basic methods.

It was under him that the first tests of "histocompatibility" were carried out. This is a way of determining the likelihood of one person being a good tissue or organ donor for another.

Dr. Russell's group injected cells from the recipient into the skin of the donor. The smaller the reaction, the greater the likelihood of success in a transplant between those two persons.

Since then, the MGH and researchers at the University of Wisconsin, the University of Southern California, and elsewhere have refined this method called tissue typing.

Henry J. Winn, Ph.D., associate immunologist, set up the typing lab here, the only one in New England.

The second method that is widening the door for transplants involves a substance called anti-lymphocyte serum (ALS). Until that came along, the only way of fighting rejection after a transplant was by using drugs that suppress the process (immuno-suppressives).

Unfortunately, immuno-suppressives can severely weaken a patient's resistance to infection. ALS proved a powerful immuno-suppressive. At the same time, ALS seems to raise far less havoc with resistance to infection.

Initial work on ALS was done at the MGH. When results seemed poor, the research ended. In recent years, Dr. Anthony P. Monaco, now of Boston City Hospital, and Dr. Russell revived the research with good results.

Between tissue typing and ALS, the MGH is now able to perform transplants with new sophistication and with results which should steadily improve.

To date, the hospital has performed over 50 such operations using either living donors or cadavers. Some patients have been living more than five years with borrowed kidneys.

Dr. George P. Baker Jr., in charge of hemodialysis (blood purification), works as a physician in kidney transplantation.

"While expanding its area of human transplantation, the MGH will continue to broaden its base of research in this field," Dr. Russell said.

Supervising this large and growing operation has become a full-time task, especially for one who is also teaching and practicing general surgery. As a result, Dr. Russell has chosen to give up much of the administrative portion of his duties as chief of general surgical services at MGH.

Dr. Oliver Cope, professor of surgery at Harvard Medical School and visiting surgeon at the MGH, is acting chief of general surgical services. Dr. Russell is John Homans Professor of Surgery at Harvard Medical School.

DR. PAUL S. RUSSELL
The MGH — A World Transplant Center

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MGH News

Vol. 27 No. 3 Massachusetts General Hospital, Boston, Massachusetts September, 1968

MGH Strives for New Doctor-Nurse Relationship

MGH is striving to change the traditional doctor-nurse relationship.

The aim is for a more acute awareness of the physician for the problems facing nursing. From this awareness, the hospital is hoping that more understanding will evolve for the nurse's role. And the feeling is that with increased understanding could come a truer partnership between doctor and nurse.

Underway only since mid-June, the effort already seems productive.

"Among the nurses there has been a definite raising of morale," Miss Mary E. Macdonald, RN, said. The new director of the hospital's department of nursing added:

"They believe that an effective channel of communication has been opened. They feel a viable system has been initiated."

What sparked the action was a communication to doctors from the utilization review committee. Miss Edna S. Lepper, who has just retired as the nursing director, authored the letter which went out on June 17.

The next day, a physician edged up to a nurse on one of the Baker floors and put his hand on her shoulder.

"Don't worry," he said. "We know how tough it is for the nurse. If there is anything I can do to help. . ."

The problem of the doctor-nurse relationship is as old as nursing. Many physicians treat nurses with great respect. The manner of some others, however, creates an atmosphere of hostility.

While arrogance sometimes plays a part, more often it is thoughtlessness that rules the relationship. Like other

Continued on Page 7

New Burns Institute: A 21st Century Hospital

"If our theory is right, we have the prototype for a 21st century hospital."

Dr. John F. Burke was talking about the Shriners Hospital for Crippled Children, Burns Institute, Boston Unit.

That hospital received its first patients in September. With Dr. Oliver Cope, acting chief of surgery of MGH as chief of staff, researchers from the MGH began moving in in August.

Built solely for burn victims, the Shriners Hospital could nevertheless influence the design of general hospitals.

"What we are doing," Dr. Burke said, "encompasses the entire area of medicine. The principles are widely applicable to taking care of all kinds of patients, not just those with burns.

"They especially apply to transplantation, cancer chemotherapy and all the huge areas medicine is just getting into."

A growing problem in all hospitals is cross infection. This is the process which leads to germs spreading through a hospital like a medieval plague.

What the Shriners Hospital has done under the generalship of Dr. Cope is to figure how best to reduce infection toward the vanishing point.

"Our methods of controlling cross infection are different from any other I know of," Dr. Burke said. "Some of the ideas are ours. Some are borrowed. It is the coordinated whole that is different."

The hospital borrows from the sterile techniques of the space industry and animal research as well as NASA programs in environmental testing.

Shriners Burns Institute . . . prototype for 21st century hospital.

"It's all put together," Dr. Burke said, "in a coordinated form that should be of great benefit to the patient."

What makes the hospital the ultimate in testing the theory on which it is built is its patients.

"Burns are the problem most difficult to solve infection in," Dr. Burke said. "If these ideas work for burns, they will work for many other situations."

To prevent life-threatening infection, Dr. Burke has designed patient cubicles — transparent plastic curtains that guard against the surrounding germs that abound in any hospital atmosphere.

Visitors have no difficulty chatting through the curtain with patients. But merely keeping the outside bacteria away from them is not enough.

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The *MGH News* welcomes letters from its readers. To avoid condensation, letters should be brief. They must be signed and should contain the writer's title or department at the MGH and home address. Names will be withheld on request.

Photographs in this Issue
by Mark Silber

EDITORIAL:

About Doctors and Nurses

Finding enough qualified and dedicated nurses is a problem for any hospital. The reasons are many and complex: older and sicker patients, more complicated care, more technical and administrative duties leaving less time for nursing care, overcrowded, understaffed hospitals to name a few.

One major reason is the doctor's treatment of the nurse. Most physicians are very considerate of nurses. In a few cases, the attitude is less than enchanting. Thoughtlessness or even arrogance determines the role of those few.

If called to task — and he rarely is — the harried doctor often points to his busy schedule.

"I don't mean to be brusque or thoughtless," he says. "Didn't even realize I was. Just so damned busy." Such a response is understandable.

There are hectic times when the most patient man "loses his cool." Yet some of the most considerate are among the busiest physicians. And on the rare occasion when such a doctor acts in an irritated or thoughtless way towards the nurse, he is man enough to apologize.

For many years, some nurses have been content to play the doctor's handmaiden. They have suffered abuse quietly and seen their already overburdened work load piled higher by the physician who doesn't take the time to communicate clearly instructions for patient care. The days of the submissive nurse in white are approaching an end. Today's nurse is generally better educated and better trained than her predecessor. In the typical patient unit, today's nurse must deliver intense and complex care. Because the nurse in the cardiac care unit spends so much time operating highly technical equipment, she often is more skilled at doing that than the intern or resident. Often she is more skilled even than the established physician who lacks the specialized experience.

The modern nurse is well aware of this. Because she is, she is less likely to stand for the practices of the minority of doctors "too busy" to be thoughtful or too arrogant to care. Such nurses are escaping to fields like community health.

So much the pity. For hospital nursing under the right conditions offers a multitude of challenge and satisfaction available in no other health work.

Compared to most hospitals today, Massachusetts General offers unusual opportunities to the nurse. This institution under the nursing leadership of Miss Edna S. Lepper, RN, did much to pioneer the unit coordinator system to help take the administrative burden off the back of the nurse. Better equipment, a progressive approach, and continuing education are other ways the MGH has been moving towards improving the situation. Yet only the individual physician can improve his own relationship with the nurse.

With that in mind, the MGH is striving towards a new era. Described on page one of the *MGH News* is a new program to improve the doctor-nurse relationship. Before her retirement last month as nursing service director, Miss Lepper prepared a letter telling doctors how they can help. The hospital already notes some boost in morale.

Often a campaign relying strictly on the human element sags after initial success. The first flush of enthusiasm turns to a trickle and then a memory. Physicians cannot allow that to happen in this case. Too much lies at stake. Failure means a decline in patient care. Success could provide an inspiration to hospitals the world over.

NEW BURNS INSTITUTE: A 21st CENTURY HOSPITAL

(Continued from Page 1)

Some people tend to shed bacteria and patients are no exception. Under ordinary circumstances, the patient could continuously reinfect himself.

To prevent that, the hospital employs uni-directional flow. A solid block of sterile air moves at the same rate in the same direction.

Air From Holes

This air streams out of holes in the ceiling, washes down over the patient and his bed and pours out holes in the floor.

Uni-directional flow helps free the vital operating rooms of bacteria. Above each of the two special Swedish operating tables, air flows out of the ceiling, sweeps down over the patient and table area to the floor and gushes out wall vents.

To keep germs from entering the operating rooms, an "air lock" guards the entrance. Nurse, doctor and patient must pass through the air lock before entering either room. Air blowing in one direction only — out of the rooms through the air lock — reduces chances of anyone bringing bacteria in.

By virtually eliminating bacteria from critical areas, the hospital also improves chances to transplant skin successfully from one person to another. Dr. Burke's team is working on a method he hopes will permit history's first successful extensive skin transplants for lethal burns.

Even outside the crucial area of infection, the MGH scientists planning the special features seem to have thought of every detail.

Therapeutic TV

Even the placement of the television sets has a medical purpose. One of the problems in treating neck burns is that the scar tissue tends to draw the chin of the victim down towards the chest, resulting in permanent disability.

To fight that tendency, however, the MGH staff thought of placing the television set overhead in a position demanding that the child crank his head backwards to watch the screen.

From each station, the nurse can view all the beds she is responsible for.

Some beds lie behind the transparent curtains. The others are visible through picture windows lining rooms bordering on walls.

An occasional adult may occupy one of the 30 patient beds on the top or patient floor. If, for example, the parent or brother or sister were burned in the same accident, the adult would also be cared for in the Burns Institute.

Research Beds

Beds may sometimes be used for research purposes for patients whose problems are clearly related to burns and injury.

Spacious laboratories containing the most modern equipment dot the second floor. Even the animals used for research are thought of. A special elevator will transport them to that level.

A large auditorium is the feature of the first floor.

With 180 permanent seats and room for a number of temporary ones, the auditorium will seat 263 persons.

Despite its size, the auditorium lacks a loudspeaker system.

"It doesn't need one," Dr. Cope said. "The acoustics are remarkable."

Meditation Room

An interdenominational meditation room near the first floor lobby will permit visitors and patients to meditate and pray.

There is a splash pool for babies to toddle in and areas for riding a tricycle and playing shuffleboard. Since burns take a long time to heal, youngsters will be able to keep up with their studies in a school room in the patient area.

Despite all its special equipment, the hospital avoids duplicating expensive machinery available in the adjacent MGH complex.

It cost the Shriners $4½ million to build and equip the hospital, one of 22 maintained by that organization. Three of the 22 are burns institutes. The other two are in Galveston, Tex., and Cincinnati, Ohio.

Judge Robert Gardiner Wilson, Jr., chairman of the Shrine's board of governors for the Boston institute, estimates it will cost the Shriners $1½ million a year to operate the non-profit institution.

Completely Charitable

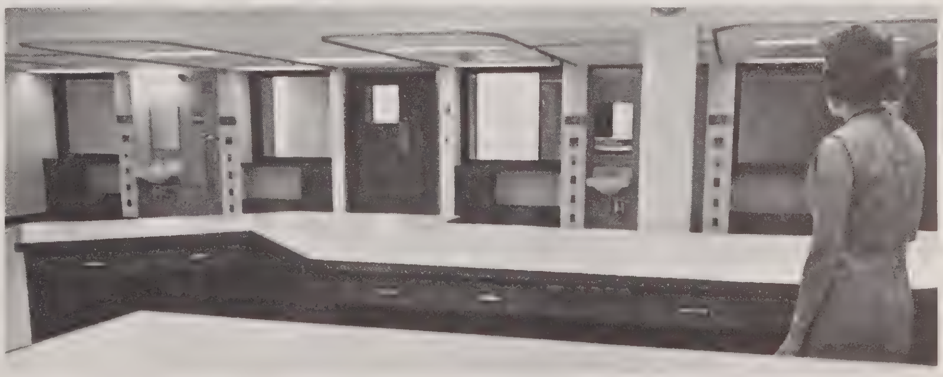
Completely charitable, the hospital will have all patients' bills paid by the Shriners who own and control it. The MGH staffs and runs the medical program.

Under Dr. Cope come a multi-disciplinary team of MGH and Shriners Burns Institute experts. With Dr. Burke as chief, the surgeons include Dr. Hermes C. Grillo, general surgery; Dr. John D. Constable and Dr. John Remensnyder, plastic surgery; and Dr. William MacAusland and Dr. Edwin Wyman, orthopedic surgery. Dr. Ronald A. Malt is chief of surgical research.

Dr. John D. Crawford is chief of pediatrics, assisted by Dr. Joseph B. Warshaw. Since most patients will be children, the pediatricians are the internists of the Institute.

Dr. Norman Bernstein heads child psychiatry, aided by Dr. William Sharpe Jr. In charge of nursing is Miss Elizabeth D. Nye, RN. She, Miss Roberta Tapella, RN, James Lawson, Mrs. Jean Leslie, RN, Mrs. Francine Margolius, RN, and Carl Olson are planning new nursing approaches with Drs. Bernstein, Crawford and Constable.

Several MGH transplant team researchers will transfer their work to laboratories in the Shriners Hospital. Dr. Paul S. Russell is in charge of all transplant investigation. Other parts of the multi-disciplinary approach include social work, dietetics, physical therapy, play therapy and teaching.



From nursing stations in Shriners Burns Institute nurse can observe children through windows. Use of uniform is optional for nurses in the new structure.

Edna Susan Lepper: A Quiet Trail Blazer

Edna Susan Lepper is a quiet, grey-haired woman with a grandmotherly smile and a grandchild's zest for life. Her placid, unassuming manner, however, hides an ability to create. This talent enabled Miss Lepper, RN, to leave behind a trail blazed with firsts when she retired in August as director of the MGH's nursing service.

"The unit coordinator is one of Miss Lepper's greatest contributions to nursing," Miss Mary E. Macdonald, RN, said. The successor to Miss Lepper, she added:

"In this hospital, the idea has gone further and faster than any place in the country."

Miss Lepper started the unit coordinator program in 1962 "to overcome to the greatest degree possible the turnover in head nurse positions and to reduce the evident frustration manifested by these nurses and passed on to the staff. There was a need for head nurses to be more active in directing nursing care."

In the course of a day, the unit coordinator runs the gamut from training, directing and coordinating the work of secretaries, ward helpers and utility room aides to public relations duties. She arranges for transportation of patients and for their discharge and performs numerous other tasks.

Par With Head Nurse

In status, salary and fringe benefits, she rates on a par with the head nurse.

Not all the nursing units at the MGH have such coordinators. One measure of the program's success, however, is the increasing demand of other head nurses to get them for their units.

"Nurses working in units with coordinators," Miss Lepper said, "have far more time for actual nursing than ever before."

By contrast, she recalls some of her duties as a night nurse here more than 40 years ago.

Prepared Breakfast

"I began at 4:30 in the morning," she said, "to make the toast for the patients and butter it and to prepare their breakfast. We had no help in making empty beds, doing the cleaning at the bedside, the utility rooms, etc.

"In hospitals lacking unit coordinators, administrative tasks have replaced cleaning."

One other way in which Miss Lepper saved nurses time for nursing resulted in the birth of the hospital's present dispatch service.

Nurses and orderlies were having to leave wards frequently to pick up specimens from laboratories. Through the Ladies Visiting Service, Miss Lepper unified the collection, leaving the nurses in their units. From that beginning evolved the dispatch service.

Other Accomplishments

Some other accomplishments of Miss Lepper:

—A nursing scholarship program which last year grew into a scholarship program for the entire hospital.

—The first hospital nursing service to provide a resident program for nursing service administrators. Miss Lepper helped establish that program with Boston University.

—A nursing staff education project here.

—Played a role in the establishment of the nurse's aide program here.

—Took part in the establishment of that same program in other hospitals through her work in the Massachusetts Nursing Association.

First in Country

Miss Lepper was the first nurse in the country appointed to the American Hospital Association committee on professional practices.

She was also the first nurse named to the U.S. Public Health Service committee on hospitals and clinics.

When she began her study of nursing, Miss Lepper herself hardly held great expectations.

"At first, I didn't like nursing," she recalled with her tender smile. "I found it too traditional and unbending. I felt hemmed in, confined. I couldn't be myself.

"I think I decided I would conform outwardly. That made it possible for me to stay. After that, I grew to love nursing."

It was 1926 when Miss Lepper graduated from this hospital's school of nursing. After 1½ years in school, she became a head nurse — a not uncommon experience for a student in those days.

Continued on Page 8

MISS EDNA S. LEPPER, RN

Mary Macdonald: A Race with Demands

Five bottles of intravenous solution were dripping their life-sustaining contents into an elderly woman.

Another 10 were lined up ready for use. In all, there were six tubes emerging from the patient. One was connected to a device to regulate her erratically beating heart, another to one that monitors it.

The scene last month was the intensive care unit in the Bulfinch building at MGH. It might as easily have been the recovery room or an intensive care area elsewhere in the hospital.

"The nurse today," said Mary E. Macdonald, RN, "has become a veritable partner to the physician in some of the curative operations of health care.

"Intensive care units throughout the hospital are arenas of life-saving action. Advances in science and technology have resulted in an enormous expansion of medical capability.

"As an earlier practitioner of nursing, I neither learned nor practiced the nursing operations involved in cardiac resuscitation — a procedure which is now included in our on-going teaching program for nursing personnel. Last month, the hospital's continuing education program trained more than 300 nurses in this area alone.

"These same advances have resulted in striking changes in the patient population . . . our patients are both sicker and older."

A recent recovery-room report showed a night census of nine patients. Seven of them were over 75 years of age.

"Nursing and nurses," Miss Macdonald said, "are in a continuing race to keep up with demands for specialized knowledge and skills which these advances place upon them.

"The accelerated tempo of action in patient-care settings with a concomitant emphasis on the curative and often technical aspects of care, have resulted in a deflection (and in some instances abdication) from the uniquely care role of nursing."

Concern about this trend is what brought Miss Macdonald back to the MGH. A 1942 graduate of the MGH School of Nursing, she left her post as associate dean and professor of nursing education at the University of Massachusetts School of Nursing to return here to study the system of patient caretaking in a medical teaching center.

"For some time," Miss Macdonald said, "I have been concerned about the hospital as a work locale for the professional practitioner of nursing. Present recruitment and retention statistics suggest that all is not well.

"I wanted to study the system firsthand to determine the factors which deter the nurse in her primary caretaking role and function."

Miss Macdonald came to the MGH a year ago this month to undertake her other study. In April, her appointment as director-elect of the department of nursing was announced.

MISS MARY E. MACDONALD, RN

Her first action was to request a change of title for the department from that of nursing service to the department of nursing.

"I consider the term nursing service to be unduly restrictive and not in keeping with the role and function of a modern medical teaching center," she said. "A department of nursing has the same tripartite functions as medicine: service, teaching and research.

"Actually, nursing as a profession is in a 'becoming' stage. So far as the service aspects are concerned, our objectives will be to establish a system of delivering care which will permit the nurse to nurse in the true sense of the professional mission . . . to create an environment in which the nurse can function as a participating member of the total health team."

Miss Macdonald has employed two resident analysts in nursing. Working with the laboratory of industrial engineering, the analysts will study staff use and quality of care in the nursing units and recommend improvements. Miss Macdonald believes the MGH is one of the first hospitals to employ its own staff to do this on a continuing basis.

"The problem of a quantitative shortage of nurses," she said, "is compounded by some misutilization of the nurse manpower available. Hopefully, the study findings will give direction to the task of determining the number and kinds of nursing personnel needed and to the subsequent task of establishing training programs to prepare them."

Continued on Page 8

Miss Mary E. Macdonald, RN, right, chats with nurse.

Medicare Offspring Packs Lots of Wallop

A committee born of Medicare has made a startling impact on the MGH.

Reared to an unexpected growth and maturity, the 2-year-old baby that the government has named the utilization review committee has been quietly improving the course of patient care.

"This may be the most important development in patient care outside of scientific and technical advances in the last half century," Dr. John H. Knowles, MGH general director, said. "I think the importance is fantastic."

Born July 1, 1966, the committee is required of all hospitals approved for Medicare. One of the main purposes was to make certain physicians did not keep Medicare patients hospitalized any longer than necessary.

Each hospital had to agree on a given period during a patient's stay when the committee would review the need for continued hospitalization. The MGH chose 21 days.

Medical necessity is the only acceptable reason for continued hospitalization, but this requirement may include the unavailability of any other place to which the patient can be sent. The committee makes further reviews at later periods during a lengthy hospitalization.

At the MGH and some other hospitals, the committee has grown in important ways bearing no direct relation to Medicare patients.

"An important portion of the committee's work is a review of randomly selected patients from the entire hospital," Dr. Victor W. Sidel said. The original executive secretary of the committee, he has returned from a year away to replace Dr. Roger H. Sweet, who performed the job last year.

Random Basis

On a random basis, the group selects one in every 200 admissions. Instead of only those over 65 years old, the patients chosen for that review can be any age. That investigation is much more intensive than the one of Medicare patients.

Just about every issue related to quality of care comes under the microscope of a physician member of the review committee! He discusses each case with the review committee's smaller executive group.

What makes the random review so effective is that no physician on the hospital staff ever knows when one of his own cases will come under the microscope.

That keeps the doctor alert. He is far less likely to get careless either about the length of patient stay or any aspect of the care delivered.

The random study is also finding previously unknown problems.

Staff Education

"We have uncovered enough," Dr. Knowles said, "to know this is important not only in patient care but also in the education of our own staff.

"For example, if the staff notifies the social service department early in the hospital stay, the duration of the stay can be reduced. The social worker can right away launch an attempt to find a post-hospital care facility."

When problems appear, the review committee's executive group seeks solutions. One of the difficulties lay in the area of laboratory utilization. Some tests were unnecessarily repeated. In other cases appropriate orders for tests or follow-up measures were lacking.

As a result of the study, a subcommittee for laboratory use has been set up. For the first time, all the laboratory heads, and representatives of the house staff and visiting staff meet together. A newsletter has been started to improve efficiency in using the laboratories.

Referred Problems

The review committee has also proven valuable as an instrument to handle problems referred from other internal administrative groups.

An outstanding example is the problem of physician-nurse relationship (see story on page 1).

Among Medicare patients, the MGH group has done 5,000 approved duration of stay reviews. Doctors are told when a review is going on.

"That appears at times to hasten discharge," Dr. Sidel said. Said Dr. Sweet:

"Very few physicians are reluctant to cooperate. One of the reasons is the tremendous demand for beds."

Waiting List

(On the average, there is a six to eight-week waiting list to get into the hospital's Baker Memorial).

An interdisciplinary group under the chairmanship of Dr. Francis M. Ingersoll, the 34 committee members include representatives of the trustees, social service, nursing, medical records, etc. All 14 chiefs of service belong and three representatives of the medical staff are elected.

A 17-member executive committee meets once a week. Two of its members form a screening subcommittee that also meets weekly.

The screening members can approve any extended Medicare stay or order a review. If the committee believes the stay should end, it invites the attending physician to meet with the executive committee.

In only five cases over the past two years, have Medicare benefits had to be cut off by agreement between the attending physician and committee even though the patient remained in the hospital.

"In the vast majority of cases," Dr. Sidel said, "discussion works and appropriate transfer plans are promptly made by the physician and the patient."

Dr. Victor W. Sidel, left, and Dr. Roger H. Sweet discuss utilization review committee, a Medicare offspring that has made a startling impact on patient care at the MGH.

DOCTOR-NURSE RELATIONSHIP

(Continued from Page 1)

hospitals, the MGH has suffered its share of the problem.

"When I first came to this office seven years ago," said Dr. John H. Knowles, general director, "it was quite clear doctors were isolated from nurses and nurses from doctors and both from the administration.

"Joint attempts of nurses and doctors and the administration have been geared to reduce this isolation."

First, the director of nursing was made a member of the hospital's general policy board, the general executive committee.

Next, nursing was represented on the all-important utilization review committee and the committee on teaching.

That representation opened the channels of communication between doctor and nurse with direct sharing of problems.

Nursing Crisis

The big change, however, came as a direct result of a recent nursing crisis. In relation to the work load the hospital was experiencing a greater shortage of nurses than any time in recent memory.

At least part of the problem was unhappiness with the doctor-nurse relationship. Dr. Knowles asked Miss Lepper and Miss Macdonald to find out what could be done. The medical staff was asked to review its position vis-a-vis nursing. The utilization review committee discussed the situation and requested recommendations for action.

A joint committee of nurses and doctors thrashed out the problems. Miss Lepper presented the findings of her investigation.

The result was the communication sent out by Miss Lepper. Distributed by the physician-dominated utilization review committee, the memorandum apparently produced the desired effect.

Understand Problem

"It has led," Dr. Knowles said, "to a general feeling on the part of nurses that doctors understand their problem and are trying to do something about it.

"We have hired more nurses the six weeks after the communication than in any comparable season in the history of the hospital."

In a large measure, the new nurses came from a stepped-up recruiting campaign. But the selling job came easier on the basis of the demonstrated support given to the memorandum.

The MGH is trying to make the doctor-nurse relationship a truer partnership. Here Miss Rita Cummings, RN, head nurse on Bulfinch 3, and Dr. Richard M. Weinshilboum, together go over the medical record of a critically ill patient.

"There has been a tremendous boost in morale in the nursing service," said Dr. Francis M. Ingersoll, chairman of the utilization review committee. "Not only has it made the nurses feel the doctors are interested, but it has also lessened the burden of nurses."

Among the apparent results for at least the time being are a limiting of open-heart surgery and an end to Saturday-morning operating.

Frank Suggestions

Although written diplomatically by Miss Lepper, the suggestions to doctors are quite frank. On medical orders to nurses, the doctors are admonished:

"Write unless impossible to do so. Write legibly, exactly, fully, as early in the day as possible . . . Avoid duplication and contradictions between members of the same team or different services. Discontinue promptly when no longer necessary. . .

"Considerable time is spent in interpreting what is meant by an order that is unclear in any manner. A nurse new to a patient care unit is confronted with anxiety of considerable proportions when she cannot interpret or be certain what is meant.

"A head nurse must ascertain daily which orders are current, a time-consuming task when there are several pages of orders for patients.

"Orders written in the daytime hours help to lessen the stress of the very busy evening period."

Minimize Anxiety

In regards to attitude, the doctors are urged to:

"Minimize the anxiety of nursing personnel by giving support. Let them know that you know that they are trying to encompass the work load. Complain to the proper persons. Avoid appearing to blame nursing personnel for things beyond their control" (such as shortage of personnel).

Some other suggestions:

"Help to avoid clutter at the bedside (by disposing of used equipment).

"Provide for one member of the house staff to be available in person at all times for each service.

"Keep the nurse informed of the plan of care (contemplated change in treatment, discharge plan, change in policies).

"Keep the unit informed about where members of the house staff can be reached.

"Clarify which doctor's orders are to take precedence when more than one doctor or service is involved.

"Minimize interruptions by using available information in a written form, by enlisting the help of the secretary or unit coordinator when appropriate."

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What's in a Name?

What's in a name? The new Surgical and Special Services Building will bear two names, neither of which is surgical or special services.

The first five floors of the entire structure will be the Gray Building. Rose Lee and Reginald Gray, after whom it is named, were the parents of Reginald Gray. The largest donor by bequest to the building, the son served as secretary to the MGH board of trustees from 1930 to 1954. His father was a trustee from 1898 to 1902.

The research wing will be known as Jackson Tower in honor of James Jackson, the first physician on the hospital's staff. In one capacity or another, he served the hospital from 1817 to 1867. Dr. Jackson helped found the institution with John C. Warren, the first surgeon on the staff.

Naming of Jackson Tower completes the honoring of the two medical founding fathers. Dr. Warren's name is already preserved in the Warren Building, dedicated in 1956.

Since the main tower of the new structure is left unfinished for future needs, those floors will remain nameless for the time being.

Plans call for dedicating the entire building some time next year. In the meantime, various areas are being opened to use.

New Clinic Studies Causes of Hereditary Skin Diseases

Better understanding of the causes of certain hereditary skin diseases is one aim of a new clinic here.

Operated by the dermatology department, the clinic will also seek improved treatment of the ailments which produce abnormal scaling of the skin.

Common external signs besides scaling include nail and hair abnormalities. The most common of these diseases is ichthyosis (literally fishlike disease).

It produces much discomfort and disfigurement and significantly handicaps those afflicted. A number of the less common disorders can also result in great disability.

Physicians are referring patients directly to the clinic which meets the first and third Thursday of each month from 10 a.m. to noon.

Some areas are opening to use in the new 14-story structure adjoining the White Building. First five floors have been named the Gray Building and the research wing is called Jackson Tower.

MISS MARY MACDONALD

(Continued from Page 5)

Miss Macdonald has inherited from her predecessor, Miss Edna S. Lepper, RN, a large base on which to build. A nine-member staff education department, the largest of any hospital in Massachusetts, is already involved in implementing a program of continuing staff orientation and education.

"The complexity of health care in a medical teaching center such as the MGH," Miss Macdonald said, "requires specialized knowledge and skills not commonly possessed by the beginning nurse practitioner. This fact places an onerous teaching responsibility on the nursing department.

"The proposed regionalization of patients throughout the hospital should render this task easier. But even more important, it should result in an improvement of the quality of nursing care rendered."

MISS EDNA LEPPER

(Continued from Page 4)

"One of the greatest changes since then," Miss Lepper said, "is that the patient is treated far more as an individual nowadays. I think the nurses also are far more individuals and this has reflected in patient care."

But Miss Lepper finds care today a much more complex thing.

"The nurse has to know a great deal more to make decisions and take independent action," she said.

Miss Lepper had a crucial personal decision to make about her own retirement.

Retirement? Not quite! She will spend three days a week in St. John's General Hospital in St. John's, New Brunswick as a consultant. She will devote one day a week to consulting duties at the MGH. She will also consult for the National League for Nursing.

Even with commuting to Canada, that should leave Monday nights free for her favorite hobby of handbell ringing.

MGH *News*

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Pilot Drug Study Can Prove Valuable Tool

An MGH study has lighted a highway that can lead to valuable drug information for physicians.

Clearly illuminated by the project is a practical method of collecting important facts now unknown about most drugs.

The pilot study here has turned up such data about eight very commonly used medications.

In the process, the researchers have also uncovered previously unsuspected information about harmful effects of three other medications.

The continuing study began in 1966. Financed by the Food and Drug Administration, its chief aims were:

1. To test and evaluate methods for increasing physician reporting of adverse drug reactions.
2. To develop a system for determining the frequency of such reactions to specific drugs in specific populations.
3. To use such methods for obtaining information about important drugs in a specific hospital — the MGH.

Many medications cause adverse effects in some patients. For the physician, the problem is to balance the possible harm against the probable gain.

Suppose a drug's purpose is merely to produce a faster sun tan.

"If it produces liver injury in even a very small percentage of patients," said Dr. Jan Koch-Weser, chief of the MGH Clinical Pharmacology Unit, "it is unacceptable because there is no medical need for the drug in the first place."

This imaginative photograph of the White Building from the portico of the Bulfinch Building (1821) was taken for a new MGH postcard by Mark Silber.

On the other hand, a medication that helps cancer patients may be useful even if it causes a very high percentage of undesirable effects.

Studies required before a drug goes on the market give some idea of adverse effects. Unfortunately, however, such testing is usually done on small groups of patients and under circumstances unlike those in which the medication will be used. Some harmful effects are

Continued on Page 5

MGH Seen 3 to 5 Years from Preserving Hearts

An MGH researcher believes that this hospital stands only three to five years away from preserving human hearts for later transplantation.

He is Dr. Charles E. Huggins, the man who made the widespread freezing of red blood cells practical. Red cells frozen by Dr. Huggins four years ago show no sign of deterioration.

"If we can overcome some difficulties," he said, "we should be able to preserve hearts."

Should heart transplant surgery become common, inability to preserve hearts would prove a serious drawback.

"There is no room for error," Dr. Paul S. Russell, chief of transplantation surgery said, "because artificial life support for the heart is so limited there is no practical way of tiding the person over until the transplanted organ starts working."

The transplant heart has to be stitched into place in the recipient immediately after the donor's death. Often, however, a good candidate for a transplanted heart dies for lack of a donor.

Having a ready supply of preserved hearts would brighten the chances of finding a good match between donor and recipient. That possibility would lessen the likelihood of nature rejecting a donated organ.

The ability to preserve a heart after death of the donor would reduce the ethical problems relating to the question of when a man is dead. If there is no urgency for a donor heart, that difficulty pales.

"The potential for preservation of the heart is much better than for preservation of the kidney," Dr. Huggins said.

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EDITORIALS:

The Criminal, the Public and the Physician

Inertia is the bane of diligence. Everyone at some time or other gets angry at some injustice. Sometimes we do something to fight it. More often, however, we tend to put off action, and then inertia takes over.

So it has been in the war against crime. Inertia and even apathy have kept most Americans from enlisting in that struggle.

All the while, the forces of crime have been growing. In its latest crime report, the FBI notes a 28 per cent increase in violent crime in just one year. Even more shocking is another report: based on current trends, half the 10-year-old boys in this country will be arrested during their lifetimes for non-traffic violations. That figure rises to 60 per cent for boys living in the city and soars to 90 per cent if the 10-year-olds are black.

In fighting that sort of statistics, the regular law enforcement agencies need the active support of private citizens. Some police departments are woefully understaffed, undereducated and undertrained. But even if every police force in the country were adequately manned, crime would still flourish. It takes the apathy and sometimes even the active support of the public for crime to thrive.

In an article on page 3 of the *MGH News*, an MGH surgeon describes some of the ways the medical profession is especially qualified to help. Sometimes it takes no more than a telephone call. In other cases, it requires a great deal more of the busy physician's time. But with the rising threat that crime is posing to our way of life, the extra effort is worth taking.

Flu Epidemics: Man vs. Mother Nature

Every once in a while man becomes a little complacent in his never-ending struggle with nature. Once he turns his back, however, nature has a way of reminding him that she is still around.

That certainly seems the case with influenza. This was to have been a mild winter for flu. Scientists have developed vaccines capable of protecting against types of influenza most likely to crop up now. One would think that with enough people inoculated and enough having had the disease, the flu bugs might eventually even die out.

That philosophy, however, fails to reckon with nature. A new strain of A-2 virus has now been reported in Hong Kong. Drug companies are working feverishly to develop a vaccine to protect against the new variety. They eventually will succeed. When they do, however, nature will concoct still another variation to keep even one of the lowliest of her creations from dying out. She always does.

The *MGH News* welcomes letters from its readers. To avoid condensation, letters should be brief. They must be signed and should contain the writer's title or department at the MGH and home address. Names will be withheld on request.

Photos by Mark Silber

EMILY POST-OP

The surgeon's decision
To make an incision
Is always impressive:
It's cool and aggressive.

But after the stitches,
The surgical pitch is
(since scars are enduring):
Be warm and alluring.

What builds reputations
Is patient relations,
And patients you please are
Where next year's big fees are.

* * *

JAM-PACKED

Though we've all heard of fungi,
Most of us lacked
Any proof of their presence among us,
'Til we opened the marmalade
(vacuum-packed)
And found it preserving a fungus.

* * *

DAEDALUS, et al.

The race to the highest of medical strata
Goes to those doctors who publish
some data,
Since building a national reputation
Requires a bibliographic foundation.

So whatever disease is the bee in
your bonnet,
Work up a series of articles on it:
Significance rests, in the final analysis,
On research, and footnotes, —
and typewriter calluses.

* * *

(The above verse was written by Dr. Michael M. Stewart, senior resident in medicine at the MGH. Other of his verse has appeared this year in such publications as the New England Journal of Medicine, the Journal of the American Medical Association, and the Canadian Medical Association Journal. Editor's note).

STRESS ON PREVENTION

Skilled Hand of Physician Can Help Law

The skilled hand of the physician can support the long arm of the law in the war against crime.

That opinion comes from an MGH doctor who heads the New England Citizens Crime Commission, an organization which has shifted gears from crime busting to crime preventing.

"There are many ways the physician can help a great deal," Dr. Edward B. Benedict said. The honorary surgeon at the MGH has himself been president of the Crime Commission the last two years.

John J. Buckley, the organization's executive director, listed some of the ways physicians are particularly equipped to help fight ever-increasing crime.

"Doctors have not been reporting all crimes to the police department," he said. "You can increase the police force tenfold but that won't solve crimes police don't even know about.

"You have to get the people reporting and this is an area where doctors who have so much contact with people can help so much."

Drug Abuse

Dr. Benedict said that both Dr. John H. Knowles, MGH general director, and Dr. Robert H. Ebert, dean of the faculty of medicine of Harvard Medical School, believe physicians should play a greater role in crime prevention.

One way Dr. Benedict suggested is in the growing area of drug abuse by youngsters.

DR. EDWARD B. BENEDICT

"Doctors have treated patients with this problem. Physicians know that these youngsters often end up with a permanent difficulty. As part of a public education program, doctors can get the message across."

In Melrose, a physician is taking the lead in finding recreation for young people. Arlington doctors have been giving up their time to examine troubled youngsters referred by a youth resource council.

Under Dr. Benedict's leadership, the New England Crime Commission with the cooperation of the Boston Police Department and Massachusetts Bay Community College has begun a special program for high school dropouts. Youngsters can work towards their high school diploma at the same time they are being paid for working towards becoming police cadets.

Another Crime Commission program has tried to prevent car thefts by reminding people to lock their parked vehicles. As a result, for the first time since World War II, automobile thefts in Boston last August showed a decline.

Last May, the *New England Journal of Medicine* editorially deplored the lack of physicians trained in the legal aspects of disease:

"Physicians seem to shun this important sub-specialty, which has about it such an 'atmosphere of violence and danger.'"

New Future

The editorial goes on to predict a possible new future for this branch of medicine (forensic pathology) incorporating the following ideals:

1. To be united more effectively with pathology.
2. To become more a part of a complete examination of the overlap between medicine and law rather than remaining a narrow specialty.

"The great public importance," the editorial concludes, "of the work being done by forensic pathologists in the field cannot be denied. The need for research and for renewed interest in this interdisciplinary field is clear and commands support."

The New England Crime Commission is itself moving into an area which borders on medical research. In certain slums, 80 per cent of the young residents get into difficulty with the law.

The crime commission wants to find out why the remaining 20 per cent manage to steer clear of trouble. To look for some answers that might help prevent crime, the commission is beginning a study of Columbia Point, the neighborhood health center project of Tufts-New England Medical Center.

Transplantation Society Elects Dr. Paul S. Russell

Dr. Paul S. Russell, chief of transplantation surgery here, has been voted president-elect by the Transplantation Society.

An international organization, the society includes the world's leading experts in the field.

Dr. Russell is John Homans Professor of Surgery at Harvard Medical School.

He will become president of the society at the next international meeting in The Hague, Holland. Dr. J. Hamburger of Paris took office as president during the September meeting in New York City.

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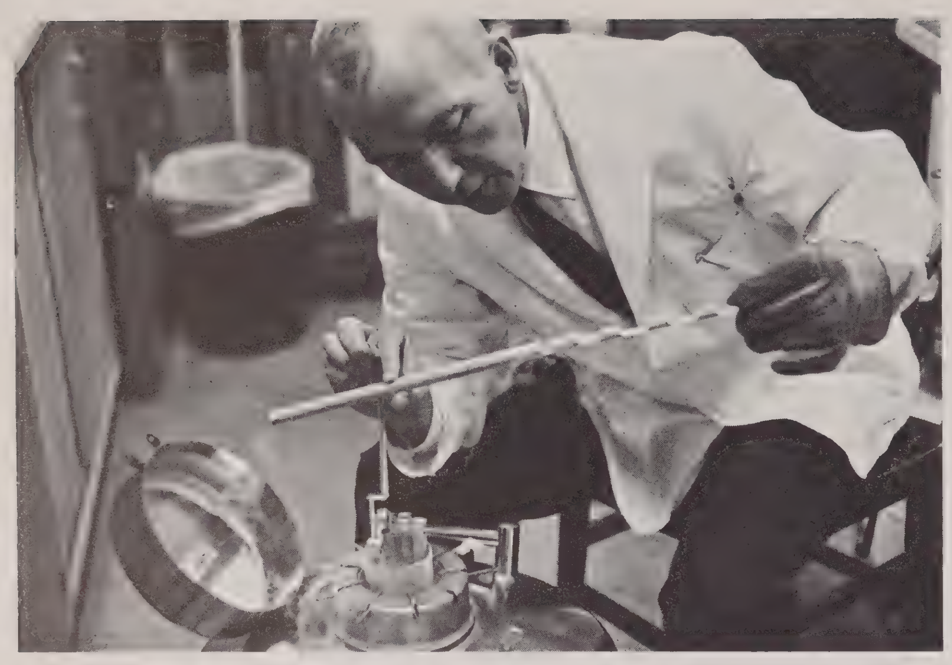

Dr. Charles E. Huggins checking some frozen sperm cells.

PRESERVING HEARTS

(Continued from Page 1)

"The kidney has many types of cells and a peculiar blood supply particularly difficult for preservation.

"There are relatively few cell types with the heart" (muscle, tissue, nerve conductor tissue and fibrous endothelial tissue).

What gives the MGH a good chance to solve the heart preservation problem is expertise in three necessary areas: heart, transplantation know-how, and low temperature biology (cryobiology).

Three Basic Problems

Under Dr. Russell's overall direction, the heart group includes Dr. W. Gerald Austen, Dr. Willard M. Daggett and Dr. Edgar Haber.

There are three basic research problems in preservation of any tissue:

1. To find out what concentration of salt damages the tissue. Then doctors would know the limits they can use for freezing and thawing.

2. To determine the maximum safe concentration of whatever protective agent is used during freezing.

3. To learn how to freeze the tissue safely to relatively high subfreezing temperatures, say −5 to −10 degrees Centigrade. The final step would be to try to freeze safely to about −70 degrees Centigrade and then thaw the heart when it is needed for use.

"Freeze Organs"

That was the same general approach Dr. Huggins used to attack the problem of preserving red blood cells. A young researcher 10 years ago at England's National Institute for Medical Research, he was told by Sir Alan Parkes:

"Huggins, freeze organs."

Huggins tried and failed. He soon learned that whole organs are complex things indeed, and turned to the red blood cell for a foundation to build on.

In 1949, England's National Institute for Medical Research discovered that glycerol, a syrupy substance used in cough drops, has the ability to protect living cells against freezing injury.

The following year, a scientist there, Dr. Audrey Smith, found she could preserve red blood cells that way. The problem, however, was to discover a way to get the glycerol out of the cells when they were to be thawed and transfused.

On a small scale, it was possible to dilute the glycerol. With one pint of blood, however, dilution meant addition of six to eight liters of salt solution, an impractical approach.

Freezing and Thawing

As a general rule in low temperature biology, the greatest percentage of damage occurs during freezing and thawing.

Should the cells swell beyond a critical size during thawing, they burst. They can much more safely withstand brief shrinkage during freezing.

A high concentration of glycerol (and certain other substances) makes the problem of freezing and thawing less critical. At the same time, the higher concentration itself adds to the difficulty of removing the glycerol.

The protective compound has to get through the thin protective cell tissue called membrane.

During removal after thawing, the protective compound tends to draw water in, through the process known as osmosis, causing swelling which can burst the cells.

Cells Clump

Dr. Huggins found he could remove the glycerol by taking advantage of the fact that the red cells tend to clump together in sugar wash solutions. The clumped cells could thus be separated from the glycerol-containing sugar wash solution.

The result is an MGH technique used in 20 other American institutions, four places in Southeast Asia and one each in Canada, Great Britain, France and Sweden.

"We have been moving in a spectrum from red blood cells to whole perfused regions like the kidney and heart," Dr. Huggins said. "Much of our function is

Prototype device used in heart preservation research.

to look at basic cell preservation and work from left to right."

Lymphocytes, a variety of white blood cells, are now preserved for Dr. Henry Winn and Dr. Russell in a relatively routine fashion for tissue typing (a method used to determine whether a potential donor and recipient for a transplant procedure are compatible). Dr. Shinji Yuasa developed the lymphocyte freezing technique.

Preserving Platelets

Dr. Huggins, who is president of the Society for Cryobiology, and Dr. Morten Grove-Rasmussen, director of the MGH Blood Bank and Transfusion Service, are trying to preserve platelets so that they can be frozen and stored like red blood cells. By causing blood to clot, platelets could save people being treated for leukemia from bleeding to death.

At present, platelets must be transfused within 24 hours (preferably within four hours) of donation.

In conjunction with Dr. Janet McArthur and Dr. Arthur Herbst of the Gynecology Service, Dr. Huggins is working on sperm preservation for infertile married couples.

The surgical low temperature unit is also trying to preserve skin for later grafting. The principal application would be the establishment of a skin bank for human transplantation.

As in other transplant procedures, having a ready supply of frozen skin would eliminate the problems involved in having a donor available at the right time.

From skin, the jump to freezing whole organs like the heart and kidney is long. But not too long ago, no one could preserve a red cell.

PILOT DRUG STUDY

(Continued from Page 1)

thus unlikely to turn up in conventional testing.

What is more, most studies of adverse drug reactions fail to show how often such effects occur. That failure makes it very difficult for the physician to weigh possible harm against probable gain.

To get the sort of information needed, Dr. Koch-Weser, Dr. Victor W. Sidel, and Dr. Roger H. Sweet used a "prospective" study.

In that technique, research begins at a point at which none of the patients taking part have yet developed whatever symptoms are being looked for.

In this case, the symptoms sought were adverse drug reactions. The patients taking part were those who were given any one of eight specific medications in the course of their regular treatment.

The pharmacy cooperated by alerting the research group whenever a patient on a service being studied received one of the eight drugs.

Five nurses were trained to look for all untoward events in the patient's course that might have resulted from the medications. When such an event occurred, Dr. Koch-Weser investigated.

"The group goes over the situation together," Dr. Koch-Weser said, "to rule out those events which do not represent adverse drug reactions.

"When there is a reaction, we analyze it in detail and determine all the factors involved."

Four of the eight commonly-used drugs studied are partly man-made penicillins. After studying 1,700 patients receiving them, the researchers conclude:

"Synthetic penicillin in the type of population we have at the MGH will produce an adverse reaction significant enough to stop the drug in six per cent of all patients."

2,000 Patients

Also studied were 2,000 patients receiving one of three medications used in treating urinary tract infections. Two sulfa drugs had to be stopped in four per cent of patients.

Nitrofurantoin (Furadantin), however, had to be stopped in 10 per cent.

"With this new information," Dr. Koch-Weser said, "we now know that Furadantin should not ordinarily be given as the first drug. The other two should be tried first since they are less likely to cause a reaction."

The eighth drug studied was colistin. Of the 300 persons receiving it during the research, more than 20 per cent had to be taken off because of serious side effects.

Nevertheless, colistin frequently is the only drug effective against an often-fatal type of infection (gram negative).

Valuable Drug

"When used appropriately against such serious infections," Dr. Koch-Weser said, "colistin is a valuable drug despite its dangers. If the doctor watches carefully for a reaction, the drug can usually be stopped before it does irreparable harm. It often is the only chance of saving a life."

Drugs — an important study.

The study has yielded a bonus in the form of new information about four other medications. The researchers learned that two medications can prove dangerous if given at the same time. They are quinidine, a heart drug, and warfarin, which helps prevent blood clots.

Since both medications are frequently given to heart patients, this new information is important.

The researchers also found that imipramine, a tranquilizer, can cause a fatal liver condition.

A third finding concerned tetracycline, a frequently used antibiotic. It was known that this medication could cause increased pressure within the heads of children. In the MGH study, this effect was for the first time found in an adult.

Good Cooperation

The scientists now know that a high percentage of physicians will cooperate with such studies. At the MGH, roughly 80 per cent now participate by noting adverse drug reactions on their patients' discharge summary.

And the researchers are convinced their methods can be applied to other hospitals.

"Our study has shown," Dr. Koch-Weser said, "that this method yields figures on the incidence of drug reactions. They can be obtained in a relatively short time with a reasonable expenditure of skilled effort and money.

"On a national scale, with several groups cooperating, it could produce important information on many drugs under the conditions in which drugs are typically used."

World Press Watches Thinking Man's Arm

Two men were edging wooden blocks into pigeon holes.

Reporters and cameramen from Europe and both coasts of America fastened their eyes on the two men in the MGH Lower Outpatient Amphitheatre.

What the news media personnel were watching was a demonstration of the "Boston Arm," an above-elbow artificial arm that an amputee can think into action.

Researchers believe that with future changes this volitional device can be made to work for those of the 7,000 Thalidomide babies with above-elbow stumps.

Joint developers with MGH were Massachusetts Institute of Technology, Harvard Medical School, and through its Rehabilitation Center and Research Center, Liberty Mutual Insurance Co.

Natural Signals

The Boston Arm employs natural electrical signals from long-unused muscles in the amputee's stump.

In one trial, a 55-year-old man was able to operate the arm with signals from stump muscles that lay unused for 26 years. It took him only one 15-minute training period to restore control over those muscles. Another amputee learned to control bending and extending of the limb in five minutes.

With it, an amputee can lift about 10 pounds and hold about 50 pounds.

A unique feedback system provides the amputee with a proprioceptive sense of the actual weight he is supporting. This is the sense which tells the human what the limbs are doing.

The Boston Arm is the first above-elbow device that the patient can will into action. It is much simpler to use efficiently than existing devices. Because of the difficulty in learning to operate cable-powered artificial limbs, few of the thousands of above-elbow amputees wear them.

Not Yet Available

While the new device works, it is not yet available for general use. The Boston Arm, however, is considered at a stage at which it could be developed for mass production.

Over his long career, the late Prof. Norbert Wiener of M.I.T. developed his theory of cybernetics, the study of control and communication in the animal and the machine. About 1960, Dr. Melvin J. Glimcher of the MGH and Dr. Thomas L. Delorme, medical director of Liberty Mutual Rehabilitation Center, began noticing that many upper arm amputees at the center were failing to use artificial arms because of the limitations of the devices. They later learned that other centers were experiencing the same problem.

Cybernetics and the Glimcher-Delorme observation led to the belief there was a possibility of developing a more natural volitional artificial arm. In the late 1950s, the British and Russians began using electrical signals from muscles to operate a simple open-and-close artificial hand.

In 1961, Dr. Glimcher, who is the Edith M. Ashley Professor of Orthopedic Surgery and chairman of the Department of Orthopedic Surgery at Harvard Medical School, and chief of the Orthopedic Service at MGH, watched the Russian hand demonstrated in Russia.

Joint Project

A prior conversation with Prof. Wiener had sparked the joint project collaboration which eventually involved all four institutions. Liberty Mutual, through its interest in the disabled, provided most of the funds in addition to participating in the research. The U. S. Social and Rehabilitation Services partially supported the mechanical engineering program at M.I.T.

The definitive research and demonstration of feasibility were done by two M.I.T. graduate students. Dr. Ralph Alter at the M.I.T. Research Laboratory of Electronics and the M.I.T. Department of Electrical Engineering worked under Prof. Amar G. Bose. Ronald D. Rothchild was supervised by Prof. Robert W. Mann of the M.I.T. Department of Mechanical Engineering.

Then a doctoral student, Alter investigated the special characteristics of the electrical signal stemming from muscle tension. Rothchild designed and constructed the motor-driven elbow and demonstrated that it could be controlled by such a signal. Rothchild's limb included the proprioceptive feedback concepts as well as a number of other unique features.

Man to Computer

Dr. Alter and Rothchild hooked a man directly to a computer for the first time. The computer sent back the signals to the electric motor which moved the arm at the discretion of the man with the desired force, velocity and position. (Dr. Alter now works at the M.I.T. Lincoln Laboratory, and Rothchild,

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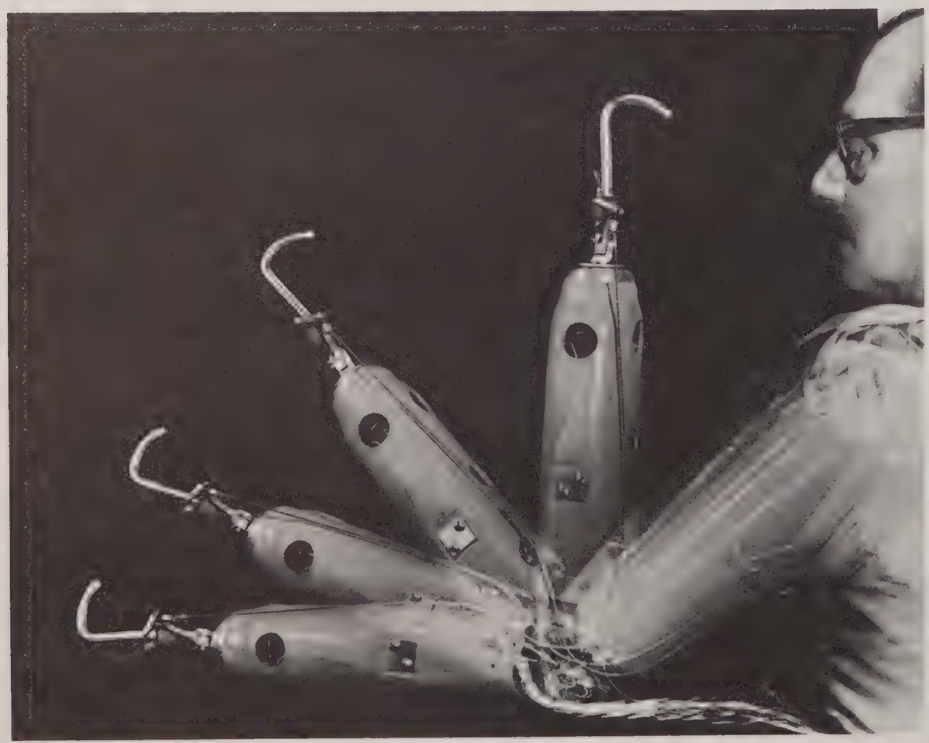


Multiple exposures show full range of motion possible with thought-controlled artificial arm.

Psychedelic Centers for Dying Persons?

Dying persons some day might go to special centers for psychedelic experiences.

A clergyman-physician has made that prediction in the Ingersoll Lecture on Human Immortality at Harvard University.

"This suggestion is not as utopian as it might sound," Dr. Walter N. Pahnke said. The chief resident psychiatrist for the Maryland Psychiatric Research Center added, "Dr. Cecily Saunders in England has already established a successful center where medical treatment is given to keep dying patients as comfortable as possible in their last days.

"LSD has not been tried there, but adequate doses of alcohol and heroin are used to combat depression and pain. Our results suggest that psychedelic drugs might accomplish much more. Certainly this hypothesis can be tested experimentally."

Dr. Pahnke would staff such centers with psychiatrists, psychologists and religious professionals.

In his lecture, he reported having treated with LSD 16 dying cancer patients in a pilot study at Sinai Hospital in Baltimore, Md.

Careful Screening

After careful screening, consenting patients undergo intensive individual psychotherapy for 8 to 10 hours. Family members also receive therapy.

Once considered ready, the patient is carefully administered LSD in a private hospital room decorated with flowers and objects which have meaning for him.

Dr. Pahnke cautioned against drawing any really scientific conclusions from his studies since there were no controls to assure their validity.

Dr. Pahnke, however, did draw some tentative conclusions:

"First, no patients seemed to have been harmed," he said, "even those who were physically quite ill. In general, about one-third of the patients were not particularly helped, one-third were helped somewhat and one-third were helped dramatically.

". . . The most dramatic effects came in the wake of a psychedelic mystical experience. There was a decrease in fear, anxiety, worry and depression.

". . . Most striking was a decrease in the fear of death. It seems as if the mystical experience, by opening the patient to usually untapped ranges of human consciousness, provides a sense of security that transcends even death.

"Once the patient is able to release all the psychic energy which he has tied to the fear of death and worry about the future, he seems able to live more meaningfully in the present".

Inoperable Cancer

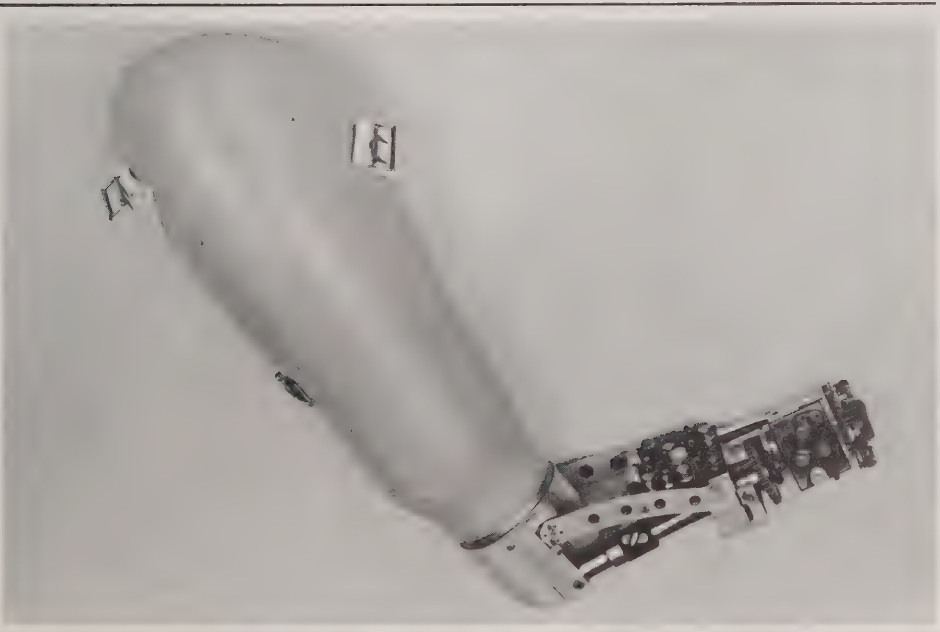
Dr. Pahnke described the case of a 49-year-old woman with inoperable cancer of the pancreas. Narcotics no longer controlled her pain. As a result the woman seemed more like a whimpering animal than a human being.

Her family could no longer tolerate her increasing pain. In addition, they feared more and more that she would discover that she had cancer and would become even more depressed. Her husband asked whether mercy killing might prove the kindest solution.

In an LSD session filled with religious symbolism, the woman reviewed many events of her life. Later that day her mood brightened and she relaxed. Her pain persisted, but now narcotics were able to control it.

A few days later, she forced from her personal physician the fact she was dying of cancer. That revelation frightened her family. When her husband broke down and began to sob uncontrollably, she reached out and consoled him. A sense of relief and interpersonal closeness pervaded the room.

Moreover, she was discharged from the hospital, and was able to live her last month at home with her family.



Stripped down model of "Boston Arm" showing vital parts.

Controlled Followup Study Urged for Dying Patients

Carefully controlled research must follow up the LSD study of dying patients.

That requirement was made by Dr. Henry K. Beecher in his formal discussion of Dr. Pahnke's Ingersoll Lecture at Harvard. Dr. Beecher, chief of anesthesia at the MGH, told the audience:

"He has presented us not with facts, but with some grounds for hope. His work has been done without controls. And I am sorry about that.

". . . It is absolutely mandatory now to proceed with a rigorously designed study and this must include the use of informed and consenting subjects, double-blind study where neither the subject nor the observer knows what was used, LSD or a placebo, and sufficient numbers of subjects so that mathematical validation of difference is possible."

Dr. Beecher objected to Dr. Pahnke's statement that the danger of LSD depends on how it is used.

"There is an abundance of evidence," Dr. Beecher said, "that LSD can produce, has produced, lasting, serious damage in young people."

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WORLD PRESS WATCHES ARM

(Continued from Page 6)

following industrial employment at Boeing Aircraft, Seattle, Wash., has returned to M.I.T. for doctoral studies).

Dr. Allen L. Cudworth, director of Liberty Mutual Research Center in Hopkinton, Mass., and Cord Ohlenbusch, electrical engineering consultant, and David Russell, mechanical engineering consultant at the research center, moved the project from the experimental stage to full development. They miniaturized and made practical the device. (Ohlenbusch and Russell previously were students under Prof. Mann at M.I.T.)

The result of the four-institution effort was a device that goes beyond the capability of the artificial hand. The Russian hand uses the muscle's electric signal to turn the hand on and off.

More Sophisticated

Much more sophisticated, the Boston Arm can be made to work with varying degrees of force. This occurs in the same way that a normal arm operates by "thinking" the amount of effort needed and translating that into the force required for a given task.

When a person wants to move a normal arm, he begins by willing the arm into action.

A cell from the brain sends a signal down the brain stem to the spinal cord and out to the motor nerve. That nerve stimulates the muscle. The muscle shortens and the arm or limb moves in the desired way. While the operation is complicated, it works at a subconscious level so that the person knows only he wants to move his arm a certain way and it responds.

It so happens that when a muscle contracts, causing an arm to move, it gives off an electric signal. If a man has lost his arm from above the elbow, he ordinarily retains the muscle in his stump. If an amputee wills a nonexistent arm into action, the stump muscle will discharge the same electric signal as though he had an arm. That signal, as tiny as it is, is what makes the Boston Arm possible.

The electric signal is amplified and used to control a battery-powered electric motor in the arm. The battery is worn on a belt around the person's waist. The motor takes the amplified signal and powers the arm into action.

Resembles Normal Arm

Made to resemble a normal arm, the Boston Arm weighs only two pounds, one ounce.

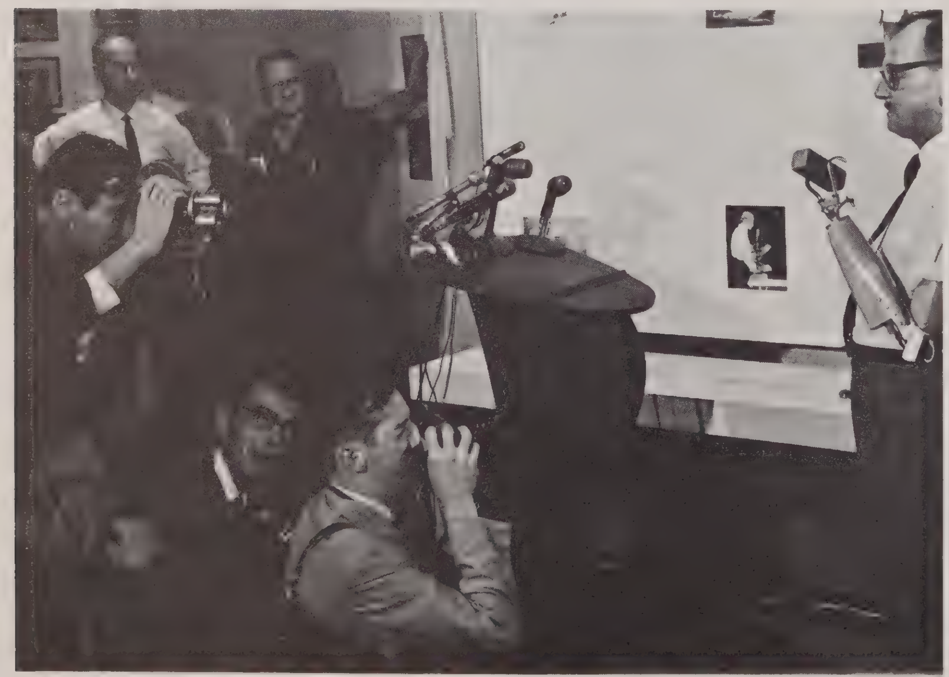
Prof. Mann, who has been a member of the Committee on Prosthetics, Research and Development of the National Academy of Sciences since 1963, will describe the arm in papers at international conferences in Yerevan, Russia, this month and in London, next month.

Eventually, the four institutions' researchers hope to add further refinements. One would make it possible for the amputee to know exactly where the arm is in space without even looking at it. An individual has the same ability with a normal limb.

Dr. David S. Alles, then a graduate student at M.I.T., proved as his doctoral thesis which was supervised by Prof. Mann, that this can be done. (Dr. Alles now works at Bell Telephone Laboratory, Allentown, Pa.)

Developers believe that even without that refinement, the amputee with a little experience can use the present arm with no more conscious thought than a normal one. The same principles used for the arm can be employed eventually to produce artificial devices for other amputated or malfunctioning extremities.

Looking into the more distant future, the researchers can envision the Boston Arm principle being applied to nerves. That might open the possibility of aiding victims of spinal cord injuries.



Amputee demonstrates the Boston Arm for world-wide press conference at the MGH.

MGH News

Vol. 27 No. 5 MASSACHUSETTS GENERAL HOSPITAL, BOSTON, MASSACHUSETTS November, 1968

Learning to Treat Nation's Neglected—the Alcoholic

Physicians take orders from social workers, nurses and psychologists in a highly unusual MGH project. Its object is to train specialists to treat one of the nation's most neglected people — the alcoholic.

These specialists can thus train others when they return to their homes as far away as Australia. With each newly educated group instructing another one, the MGH project could plant seeds which in a few years could theoretically grow a forest of specialists.

Right now the specialty has but a few trees. Even statistics about alcoholism are poor, according to Dr. Morris E. Chafetz, director of the MGH Ambulatory Psychiatric Services, and associate clinical professor of psychiatry at Harvard Medical School.

Alcoholism is believed to be the third or fourth largest public health problem in the country. Some experts place Boston second and others, fourth, among major American cities for the severity of the problem.

There is no doubt about the dubious honor of being first: San Francisco.

"One study," Dr. Chafetz said, "has revealed that the extent of alcoholism problems in the United States is such that if every psychiatrist in the country decided to treat alcoholism, there would be just enough psychiatrists to treat all the alcoholics in the state of California."

Nor would diverting the already overworked non-psychiatric physician to the treatment of alcoholics by itself prove helpful.

In theory, physicians have at least some understanding of the problem. Their attitudes, however, seem to get in the way.

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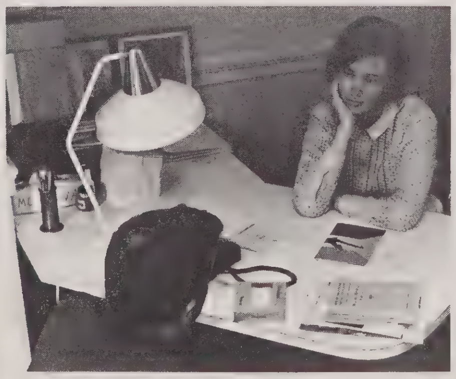

Psychiatric Social Worker Mrs. Trudy Summers chats with an alcoholic.

Nurse-Interns Train for the Era of Specialism

Fifteen nurses have begun an MGH internship program believed unique.

Its goal is to teach them specialties that will enable them to nurse ably in the complicated world of teaching hospital medical centers.

"The basic programs in nursing are geared to the preparation of the generalist," said Miss Mary E. Macdonald, RN, director of the hospital's Department of Nursing.

"The enormous expansion of medical capability requires more and more the services of a specialist. The care-taking activities here are too sophisticated for nurses lacking special training. That goes for the baccalaureate graduates as well as those from associate degree and diploma programs.

"And when I talk about practice here being too complex for the nursing generalist, I'm not referring only to our special care units. The same is true for the majority of the patients coming to the MGH. In general, the same is true for any medical center teaching hospital."

To add specialization to the base of general nursing preparation, Miss Macdonald decided to give the registered nurse a new option at the MGH.

"I believe it is the responsibility of this hospital," she said, "to offer this type of program. The patient population here lends itself to advanced education because of the complicated types of cases seen here."

Miss Macdonald purposely avoided publicizing the program. She and her staff easily recruited 15 top June graduates of nursing schools strung from Indiana to North Carolina. Five more will join them in February.

Instead of offering interns more money, Miss Macdonald won them with annual salaries of more than $1,000 under the beginning staff nurse level.

"I look upon this as an educational privilege," she said, "and I believe the intern should be willing to contribute to it. I didn't consider that it would be fair to the staff nurse to have a person with a controlled learning assignment getting the same salary. This also screened out the collegiate nurse coming along for the ride."

The program began quietly in September with a two-week orientation. After that, interns started practicing in the areas of their own choice. Work in the children's and heart care units has captured the majority.

Each intern defines her own goals and proceeds at her own pace, with the

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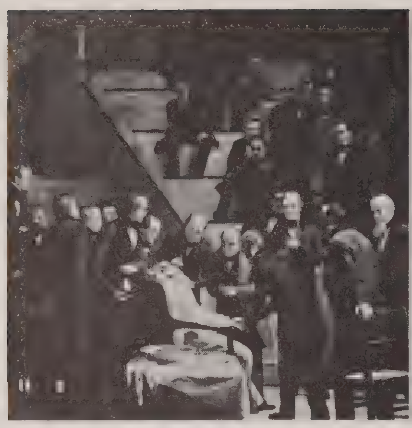

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EDITORIALS:

A Lifeline for the Neglected–the Alcoholic

Six of ten Americans drink alcoholic beverages and of these six, one in twelve is an alcoholic. About half the alcoholics work but lose three more weeks yearly than the average employee. The alcoholic has twice as many industrial accidents as other workers.

These facts translate into millions of dollars lost annually to American industry through alcoholism. Moreover, six of seven alcoholics is an intelligent person between 35 and 55 years old — not a skid-row type. That fact translates into an economic and social problem for tens of thousands of American families.

Even though alcoholism is believed the third or fourth largest public health problem in the country, little has been done to cure that ill. One of the major difficulties has been a severe shortage of people qualified to treat the alcoholic.

Now the MGH has an opportunity to make a major contribution. With a 3-year federal grant, the hospital has begun to train specialists. The first-year groups include but 14 persons, only a thimble-full in comparison to the sea of alcoholism that must be bailed.

What makes the MGH program described on page one of the *MGH News* so exciting, however, obviously is not its own limited initial scope. A unique feature of the training grant lies in the fact that nurses, social workers, psychologists and clinical assistants — as well as physicians — are learning the needs of alcoholics. When they return to their home communities, these new specialists will be able to care for those who abuse alcohol. More important, however, they will themselves be able to start similar courses to train others. Thus are seeds being broadcast that might one day go far towards solving an acute shortage.

The Nurse: Medicine's Newest Specialist

November 3 to 9 is professional nurse week. With its page one announcement of the internship program, the *MGH News* salutes the nursing profession.

The program itself is an indicator of what is happening to that profession. Until now, a nurse with a general nursing education could be reasonably sure of being able to care adequately for the sick. In most community hospitals that remains the case. Not so at teaching hospitals like the MGH where complex illnesses require special knowledge.

With this in mind, the Department of Nursing has begun an internship program to train specialists. Like the grant for training specialists in alcoholism, the program could bear results that extend far beyond the grounds of this hospital.

BOOKS:

The Doctors Warren: A Narrative History

By RHODA TRUAX

(Boston: Houghton Mifflin Company, 1968)
Review by Henry R. Viets, M.D.

(Edit. Note: Dr. Viets, a former editor of the *MGH News*, was a neurologist at the MGH until 1951. He is now the consultant for the historical collection at the Francis Countway Library and an MGH honorary physician.)

The history of the five generations of the Warren family of Boston affords a striking panorama, a picture not duplicated elsewhere, of American medicine for over 150 years. Each of six Warrens living during this era were surgeons, although with a few exceptions, they did not profoundly affect the technical aspects of their profession.

But in directing the general course of medicine in the New World they were almost unexampled. From the standard of patriotism set by Joseph, the courageous stand taken by the first John Collins in 1846, and the magic touch of the second John Collins in relation to the rebirth of the Harvard Medical School, each Warren influenced profoundly the development of hospitals, medical journalism, teaching and research.

In this book the full Warren story has been told in a narrative form by a skillful essayist and biographer. It is both readable and interesting, marred only by occasional historical inaccuracies, particularly unfortunate in a story otherwise so attractively written. At the very apogee of the Warren saga, at the first public demonstration of the use of ether in a surgical operation, on October 16, 1846, Gilbert Abbott becomes Gilbert Abbot; Mason Warren hands over the knife to his father, Dr. John Collins Warren, when the son was not even present; and brushed aside are all references to the photographer, the brash newspaper reporter, and even to Warren's "house pupil" who played such an important role in the preliminaries.

In spite of its deficiencies, this book should be widely read, for it tells a rich story of a lively, dynamic family, who projected a continuous picture of advancing medicine throughout the years. In spite of financial troubles, indifferent health and minor scandals, the Warrens moved on, decade by decade, to higher ground. They made few mistakes, and none of importance.

Two Related Hormones Open New Trails

A newly-arrived MGH scientist is exploring various promising trails blazed by his pathfinding research on two related hormones.

Dr. John T. Potts Jr. has just returned from the National Heart Institute to head the Endocrine Unit at the MGH. Immediately before coming, he was awarded the 1968 Ernst Oppenheimer Award of the Endocrine Society for his work with parathyroid hormone and thyrocalcitonin. At age 36, he is the youngest person ever to win the award, given annually for outstanding research in endocrinology.

Dr. Potts and other investigators at the National Heart Institute, carefully worked out how the two hormones work together to regulate the amount of calcium in the blood.

Nature uses the two in a precise balancing act that provides just the right amount of blood calcium.

Parathyroid hormone acts to release calcium from the bones, raising the blood-calcium level. Thyrocalcitonin blocks the release of calcium from bone, thereby lowering blood calcium.

When blood calcium increases, thyrocalcitonin production goes up while the parathyroid hormone in the blood decreases. Conversely, when blood calcium falls, thyrocalcitonin concentration in the blood declines and parathyroid hormone production increases. Thus is the precise control provided.

Interned Here

The path which led Dr. Potts to various key discoveries about the two hormones began during his internship and residency at the MGH in 1957-59.

There was a lot of basic research here then in hyperparathyroidism, a disease in which the parathyroid gland produces too much hormone.

Dr. Oliver Cope, now acting chief of surgery, was renowned for work on parathyroid disorders. There was also a tradition in fundamental research in this field including such famous investigators as Drs. Fuller Albright, Walter Bauer and Joseph Aub.

After leaving the MGH, Dr. Potts began basic research at the National Heart Institute. Under Dr. Christian B. Anfinsen, he learned basic methods for analyzing the structure of polypeptides, a class of hormones including parathyroid.

Another early step was to develop a method (radioimmunoassay) for determining the minute amounts of polypeptide hormones in human blood.

Two-Month Period

Recently Dr. Potts and his colleagues applied similar methods to the isolation and analysis of thyrocalcitonin and worked out a radioimmunoassay for detection of thyrocalcitonin in blood.

In a two-month period this year, he and his colleagues announced in two published articles that they had:

- Determined completely the intricate chemical structure of thyrocalcitonin.
- Demonstrated the compound's importance as a hormone in regulating blood calcium concentration.

Working with Dr. Potts on these studies were Drs. Hugh D. Niall, Henry T. Keutmann, H. Bryan Brewer Jr., Leonard J, Deftos, and Michael R. Lee. And now, Drs. Niall, Keutmann and Deftos have joined Dr. Potts at the MGH.

Basic Research

Teaming with other MGH scientists, the re-assembled group is continuing basic research on both hormones. At the same time, they are concentrating on applying their new findings to improve diagnosis and treatment of patients with various diseases of calcium and bone metabolism.

Applying their assay technique, the physicians hope to understand better the possible role of thyrocalcitonin in these diseases.

A second major research project involves use of the assay for parathyroid hormone in the diagnosis of suspected parathyroid tumors.

Finding a high concentration of hormone in blood confirms the diagnosis. However, it is important for the surgeon in planning his operation to know where the tumor is. Although it is usually situated on either side of the neck, it may occasionally lie in the chest; or there may be more than one tumor.

New Technique

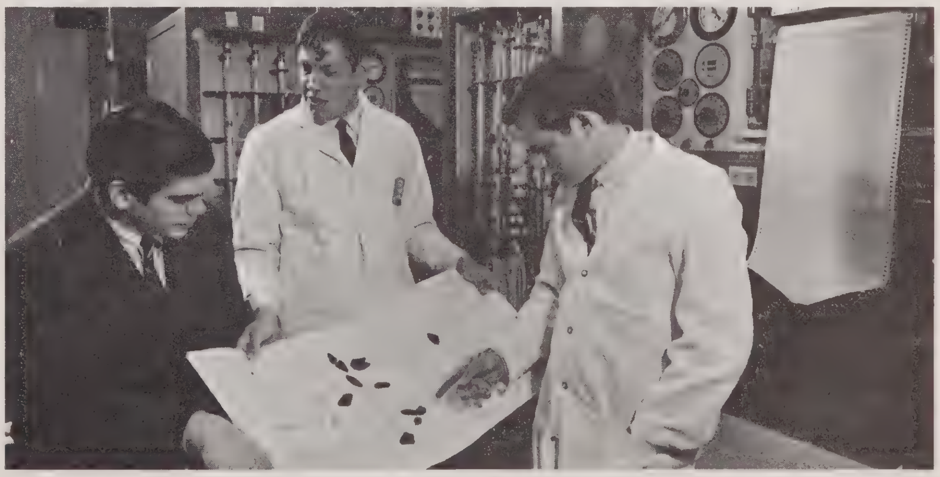
The MGH group is trying a new technique that has made it possible to locate these tumors without the need for exploratory surgery.

These studies are being done by Drs. Richard Reitz and Timothy Murray of the Endocrine Unit with Drs. James J. Pollard and Donald J. Fleischli of the Radiology Department and Drs. Cope and Chiu-an Wang of the General Surgical Services. The radiologists use a special tube called a catheter to take blood samples from the major veins draining the neck and chest.

From these samples, they determine the amount of parathyroid hormone at each key site.

Finding a high concentration near a particular vein indicates that the tumor is nearby. If such a concentration is found in more than one vein, several tumors are likely.

Work with the method also involves study of other conditions in which too much of the hormone is produced. One such study is being done in patients with kidney failure, especially those who are to have kidney transplants.



"Fingerprints" of various fragments of thyrocalcitonin, a newly discovered hormone important in calcium metabolism are examined by Dr. John T. Potts Jr., left, Dr. Henry T. Keutmann, center, and Lynn Callahan. Research under Dr. Potts at the National Heart Institute led to working out the complete structure of this hormone. Dr. Keutmann as well as Drs. Hugh D. Niall and Dr. Leonard J. Deftos from the NHI group are continuing the research with a newly organized group at the MGH's Endocrine Unit now headed by Dr. Potts.

From Asylum to Hospital: 150 Years at McLean

"The Trustees of the Massachusetts General Hospital hereby give notice that the Asylum for the Insane at Charlestown will be ready for the reception of a few patients on the first day of October next, and applications may now be made for that purpose."

This notice ran in the September 1, 1818, issue of the *Boston Weekly Messenger*. The Asylum to which it refers is today the McLean Hospital in Belmont, celebrating this year the 150th anniversary of the admission of its first patient.

Nathaniel Bowditch, in his official *History of the Massachusetts General Hospital*, first mentions patients with reference to Nov. 23, 1818. On that date, the visiting committee reported that nine patients had been received. But the first patient was actually admitted Oct. 6, 1818, and 25 years later, Ebenezer Francis, a trustee, still remembered it well:

"A father asked to have his son received as an inmate; and the committee spent three hours conversing with him in order to learn all the particulars of the case. He informed them that he believed his son to be one of those spoken of in the Bible as 'possessed with a devil'; and when asked what remedial measures he had adopted, replied that he was in the habit of whipping him." The patient was completely cured; and upon discharge he became a peddler and acquired a small fortune.

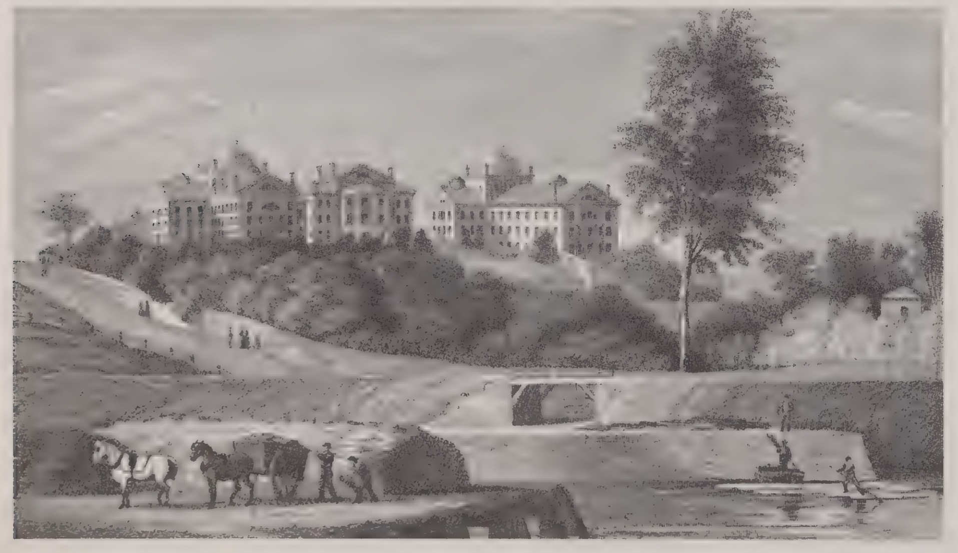
Innovative Measure

An asylum for the insane was, in 1818, a very innovative measure, regarded with some suspicion by the public. The mentally ill were generally held to be dangerous, worthy only of being locked up, and, like the first patient, "possessed with a devil." But the founders of the MGH, realizing the need for such an institution, included it in the plans for the general hospital. In fact, the asylum received its first patient before the hospital was completed.

The 60-bed asylum was located on the Joy, or Barrell, Estate in Charlestown, overlooking Miller's River. Bowditch describes it in great detail:

"The lot is about five hundred feet wide by sixteen hundred feet in length, extending to the water, with the flats appurtenant. Upon it stood a dwelling-house, built by Joseph Barrell, Esq., a former owner, and which has been since enlarged and altered, and is now used as the residence for the Physicians and the Superintendent and their families. [The dwelling-house was designed in 1793 and altered in 1818 by Charles Bulfinch.] The two brick wings at first erected have since been enlarged by additions of the parts surmounted by domes, and constitute the present buildings used for the male and the female patients. . . .

"The ground falls off so rapidly that these wards are entered at the second story; and there are in them so many dark passages, so many ascents and descents, and so many turnings and twistings, that, should the oldest Trustee of the institution be suddenly left alone during a visit, he would probably be puzzled to know exactly where he was, or by what means he could best escape from the labyrinth around him."



McLean Asylum in 1844

Treatment, Not Custody

Despite the dark passages, the administrators and doctors were truly enlightened. The McLean Asylum, named in 1826 for John McLean, a Boston merchant, was one of the first institutions in America to concentrate on treatment of the mentally ill, rather than on their custodial care.

Dr. Rufus Wyman, the first superintendent, and Dr. Luther V. Bell, his successor, left a lasting mark on the hospital. Joseph Garland says in *Every Man Our Neighbor* that "Dr. Wyman's 'system of moral management' of the mentally ill which was followed devotedly by Dr. Bell would be considered progressive even by today's standards.

"Both men deplored the use of restraint in any form, and kindness toward patients was the strictest rule of hospital. Great emphasis was placed upon occupational therapy. Productive work, games and diversions and outdoor exercise were made a way of life, all of which, Dr. Wyman reported as early as 1822, 'have a powerful effect in tranquilizing the mind, breaking up wrong associations of ideas and inducing correct habits of thinking as well as acting.' "

The hospital continued to grow and develop, moving to its present location in Belmont in the 1880s and changing its name to the McLean Hospital in 1892. More importantly, McLean continued to be a leader in the field of mental health. In 1882, it opened the first training school in the world for nurses in a hospital for the mentally ill.

New and innovative research began under the direction of Dr. Edward Cowles, who appointed Dr. William Noyes as pathologist in 1888. The following year they started what was probably the first multidisciplinary approach to the study of mental illness when they inaugurated a laboratory combining pathology, anatomy, neurology, physiology, psychology, and psychiatry.

* * *

(The above is the first of a two-part series commemorating the 150th anniversary of the admission of the first patient to McLean. The second article will deal with the hospital today and its future. Editor's note).

James Jackson Putnam: A Life of Firsts

On Monday, Nov. 4, 1918, James Jackson Putnam, M.D., passed away quietly in his home, his death almost unnoticed in the excitement of election day and the approaching armistice of the first world war. Monday, Nov. 4, fifty years later, the anniversary of his death attracts even less attention; but his contributions to the fields of neurology and psychiatry are not so easily ignored.

Born in Boston in 1846, Dr. Putnam attended Harvard and Harvard Medical School. After graduation from the medical school in 1870, he was a "house pupil" (medical intern) at the MGH for a year and then left the United States for study in Leipsig and Vienna. He soon returned to Boston, however, to begin an outstanding career of pioneer work on the nervous system.

Harvard Professor

In 1872, he was appointed a Harvard Medical School lecturer on nervous diseases, and from that point on, his life was marked by firsts. Two years later, he helped found the American Neurological Association and immediately became its first president. In 1893, he became the first professor of diseases of the nervous system at Harvard, and at the MGH he started the neurological service and a psychiatric service.

In 1906, he published the first paper in English on the clinical use of Freud's psychoanalytic method. The Boston Psychoanalytic Institute has called the paper "the first great landmark in American Analysis."

Host to Freud

His interest in psychoanalysis led him, in 1909, to host Freud and Carl Jung at his camp in the Adirondacks and to sponsor at Clark University the first American lecture course given by Freud.

Thrived on Adversity

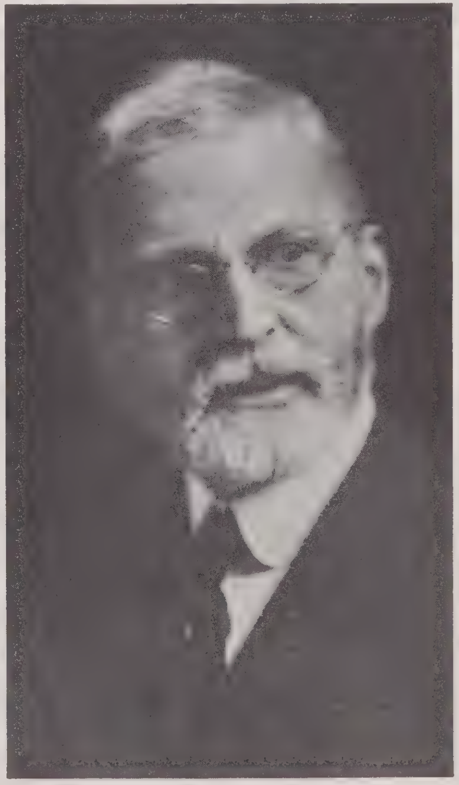
It was against the strong opposition of his colleagues that Putnam was such an active proponent of psychoanalysis, and it was to their disgust that he took Freud and Jung on a tour of the MGH. But Putnam, it seems, thrived on adversity. When the MGH would not permit him to maintain a neurological lab on its premises, he accommodated the world's first neuropathological laboratory in his own home. This lab eventually evolved into the Harvard Medical School Department of Neuropathology.

His determination to do what he believed in was overwhelming. Despite his slight physical stature and his shy, mild manner, he had what his nephew, Dr. Tracy Jackson Putnam, calls "a will of iron." He was guided by an instinct toward perfection which made Freud uneasy. The Father of Psychoanalysis said of him, in characteristic language, ". . . he was one of those happily compensated people of the obsessional type for whom what is noble is second nature and for whom any concession to unworthiness has become an impossibility."

"Worst Lectures"

His knowledge was so great that he had trouble teaching undergraduates. One of his former students recalls that "he gave the worst lectures of anybody — well, perhaps not the worst: there were a lot of bad lectures." But he was good with graduate students, especially serious ones, and his writings on any subject were always lucid and interesting.

Today, the James Jackson Putnam Professorship of Neurology at Harvard, established in 1919, and the James Jackson Putnam Children's Center in Roxbury, for the psychiatric treatment of children, stand as tributes to the greatness of his contributions to the fields of psychiatry and neurology.



DR. JAMES JACKSON PUTNAM

DR. HERMAN M. KALCKAR

Danes Honor Dr. H. Kalckar With a Scientific Symposium

Sixtieth birthday parties generally aren't news, but how about the one given in Copenhagen for an MGH scientist?

To say that Dr. Herman Moritz Kalckar is well known in his native Denmark is rather an understatement. His birthday party took the form of a scientific conference held at the Royal Danish Academy of Sciences in his honor.

Attending were many of the scientific and non-scientific greats of Denmark. Among those presenting papers were four Nobel Prize winners including Dr. Carl F. Cori of MGH.

The final day of the meeting, a birthday testimonial banquet given by the Alfred Benzon Foundation of Denmark took place.

Dr. Kalckar came to this hospital in 1961 as Henry S. Wellcome Research Biochemist and Harvard Medical School professor of biological chemistry. A frequent visitor to America since 1939, he at one time worked with Dr. Cori at the Washington University School of Medicine in St. Louis. Dr. Kalckar is internationally known for his research in biochemistry.

He applies the principles of biochemical genetics to the understanding and treatment of disease.

Treating the Nation's Neglected–the Alcoholic

(Continued from Page 1)

"They only make a diagnosis of alcoholism," Dr. Chafetz said, "when they run into a skid-row alcoholic. Skid-row alcoholics represent only three to five per cent of the total problem. Therefore, 95 to 97 per cent don't get diagnosed until they approximate the skid-row alcoholic.

"It's like waiting until cancer metastasizes [spreads] before starting to treat it."

Part of the problem is that doctors have not been receiving training in the treatment of alcoholism. A government official's survey has been unable to find any medical school training program on treating alcoholism per se.

Lack of Courses

What courses exist touch only on complications such as liver disease and DTs.

In 1956, the American Medical Association prepared a medical school curriculum for teaching of alcoholism.

"To my knowledge," Dr. Chafetz said, "it has never been implemented at any medical school.

". . . There has been a recent burst of interest across the country with the creation of a national center and with the creation of the health secretary's Advisory Committee on Alcoholism."

It was with this background that the National Institute of Mental Health awarded the MGH a 3-year grant to train specialists in alcoholism. The grant will pay $205,000 the first year.

There are 14 participants divided into two teams. On each, there is a physician or psychiatrist, a nurse, psychologist, social worker, and three clinical assistants.

Different Leaders

A different participant becomes the team leader every 10 weeks. Thus, in the course of the year, each team member can exercise leadership in a group setting.

For three days each week, the group operates as a team in three hospital settings: the Alcohol Clinic, Acute Psychiatric Service and Overnight Ward. After orientation to each unit, the team has assumed responsibility and authority for care of the patients coming to the group for help.

Participants engage in partially elective special interest projects one day a week. Someone with a special interest in tuberculosis alcoholics, for example, might work at Middlesex Sanatorium.

Flexible in design, the program encourages each team to develop its own philosophy and system of care.

"There is no such thing as the alcoholic," Dr. Chafetz said. "We believe there are people who manifest a wide range of problems through an undue preoccupation with alcohol and its use to the detriment of physical and mental health, by loss of control when drinking is begun, and by a self-destructive attitude in dealing with personal relationships and life situations."

Several Causes

Dr. Chafetz said that alcoholism results from several causes. One is disturbance and deprivation in early life experiences and "related alterations in basic physiochemical responsiveness."

Another is identification with significant figures who deal with life problems through a preoccupation with alcohol. A third is "a sociocultural milieu that causes ambivalence, conflict and guilt" in the use of alcohol.

"Regarding treatment . . . ," Dr. Chafetz said, "the faculty holds no brief for invariant use of any particular form of therapy. We believe that treatment programs should be individualized, tailored to the needs and resources of the person.

". . . Physical treatments — vitamins, hormones, tranquilizers, sedatives, — must be accompanied by psychological methods of care in order to be effective. . . . Abstinence as a goal in treatment should be applied judiciously according to individual circumstances; in many instances, complete cessation of drinking is an unrealistic goal, and insistence upon it will subvert other goals of treatment.

"Treatment of full-blown alcoholism is less effective than prevention in reducing its incidence and prevalence."

Widespread Facilities

What helped the MGH become the center for the pilot program is its widespread training facilities.

The Alcohol Clinic here is open daily and three evenings weekly for outpatient treatment of alcoholics and their relatives. Closely integrated with the clinic is the Acute Psychiatric Service. One-third of the 7,000 annual patient contacts at the service are made by persons with alcohol-related problems.

Alcoholics with acute medical-surgical problems are frequently hospitalized for up to three days at the Overnight Ward.

To supplement its own facilities, the hospital works with a variety of community agencies. In turn, the facilities of the MGH are available to those agencies. Care is taken, however, in placing patients.

"We try to avoid dumping patients on other agencies," Dr. Chafetz said. ". . . When a bad referral is made, it is the patient who suffers."

Brian Kacinski, 1-month-old Burnham patient, lies in the capable hands of Elizabeth Ambrose, RN, a nurse intern. Looking on is intern preceptor, Derry Ann Moritz, RN. (Photo by Mark Silber)

Nurse-Interns Train For Era of Specialism

(Continued from Page 1)

guidance of a nurse preceptor. RNs Miss Eileen Ryan and Miss Derry Ann Moritz, formerly members of collegiate faculties, are the preceptors.

"We get together and have these group discussions with the preceptor," said Miss Judith Oehler, RN, a 1968 graduate of Skidmore College in Saratoga Springs, N.Y. "It's really fantastic.

"We discuss all the problems we have. If you want to work at a faster pace, you can. If you want a slower pace, you can. Could you ask for anything better?

"I think you will find our group is strongly motivated, and we want to do a lot of work on the outside. I do at least three hours reading every night."

While the young nurses are studying, they are also delivering patient care. During such periods of actual nursing, the interns are responsible to the head nurse for all aspects of patient care.

Judith Oehler, RN, right, a nurse intern, gives drink to David Truesdale, a cardiac care patient in Phillips House. Eileen Ryan, RN, center, intern preceptor, looks on. (Photo by Mark Silber)

Special Skills

In learning the special skills of highly technical aspects of patient care, a new nurse largely has to learn by doing. There just isn't time in the busy hospital setting to provide her with detailed instruction.

"In this program," Miss Oehler said, "we really get thorough training. We aren't just thrown in with a lot of machines we don't understand."

Many of the interns are seriously considering following up the year program by going on for master's degrees in their chosen specialty.

Is there a danger of the advanced college program duplicating much of what they learned through the internship?

"Our program offers broad areas of choice," Eileen Ryan said. "Two of our pediatric interns are interested in child psychiatry. Here, though, they are getting an overall experience in pediatrics. In master's degree programs they can specialize in child psychiatry."

Some interns like Judith Oehler are thinking of returning to the MGH even if they go on to postgraduate college work. Others eventually may choose different hospitals.

High Loss Rate

"I am hoping we can keep them all," Miss Macdonald said. "We certainly can use many more clinical specialists than we have, but we have a responsibility to prepare nurses for other hospitals also."

One reason more clinical specialists are needed is the high rate of loss of hospital nurses to other fields such as public health. This holds especially true for four-year college nurses

"We started with the college group," Miss Macdonald said, "because we felt their high attrition rate reflected a special need for this type of program at the MGH.

"If this is successful and if there is an expressed interest, similar programs will be opened to associate degree and diploma graduates. Larger groups are anticipated next year if this initial experiment meets with success."

Of Ships & Skin & X Rays, Cannibals & Cults

(Continued from Page 8)

Dr. Robert C. Moellering, an MGH specialist in infectious disease, and Dr. Melvin E. Clouse, an assistant in radiology, were among those who made the trip this summer.

"They Were Scared"

"The first day we X-rayed a few," Dr. Clouse recalls, "they were scared. Some went home that night convinced they were going to develop pains, and I guess they talked themselves into it. They said they had chest pains, and they scared everyone off, and no one else would come."

Using a little psychology, the anthropologists talked the natives out of the idea that the X rays can cause pain. In fact, when the pains disappeared, some of the natives seemed to hold the X rays responsible for that, too.

"Some of the old guys who hadn't had X rays started coming in," Dr. Clouse said, "complaining of aches and pains in the chest or back. They would point to the X-ray box and ask for some of that white man's medicine."

Another incident Dr. Clouse found less reassuring. In the evening, he used to show X rays of some of the natives to those of the islanders who would congregate at his unit. The youngsters would look at the films and giggle.

When Dr. Clouse showed them to the older natives who once practiced cannibalism, he would point out various parts of the anatomy. From their reactions, he got the uncomfortable feeling that some of the older natives knew more about human anatomy than most people.

"I would assume," he said, "they used to learn anatomy at dinner."

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Of Ships & Skin & X Rays, Cannibals & Cults

Wonderful device, the X ray. Or so it seems to natives of the Solomon Islands in the Philippines.

Along with other means, Harvard's Peabody Museum is using the X ray for studying the natives to clear up a mystery about the origin of the islanders. Helping are some MGH physicians.

One purpose of the Peabody expeditions is to combine medicine, anthropology and linguistics to come up with evidence that might explain where the various Solomon islanders came from.

Bone structures, blood types, etc. might provide clues. So might knowledge about customs or word origins.

Another purpose of the expeditions is to study the relationship among culture, biology and disease.

To prepare the natives for visits in 1966 and 1968, social anthropologists lived among them for two years previously, learning customs and language.

The Peabody Museum's Department of Anthropology and the physicians have lived among two strikingly different types of native groups.

Blonds Too

In the southeast Solomon island of Malaita this past summer, the anthropological-medical team encountered brown-skinned people, a surprising portion of whom are blond. Their features are only partly Negroid.

In 1966, however, the scientists lived with the people of the western Solomon island of Bougainville. There the natives are intensely black with more Negroid features.

"It is a great mystery," Dr. Albert Damon said, "to see an intensely black pocket surrounded by a sea of lighter skin." Dr. Damon is a physician and anthropologist who directs the Solomon program.

A 1951 graduate of Harvard Medical School, he interned in medicine at the MGH the following year. After a residency at the Presbyterian Hospital, New York City, he spent five years as a clinical fellow at the MGH's Department of Medicine. He was an associate professor of epidemiology at the Harvard School of Public Health until 1965 when he went to the Peabody Museum.

"I still consider myself an epidemiologist," he said.

Helping Dr. Damon with the Solomon study were several MGHers who did laboratory work at the hospital. George Szabo, Ph.D., and Dr. Howard P. Baden examined skin and hair at the Dermatology Laboratory. Dr. Harvey L. Levy studied blood and urine specimins at the Joseph P. Kennedy Jr. Memorial Laboratories.

Return Expedition

Two sets of social anthropologists will spend about 18 months preparing the natives for a return expedition to Bougainville in 1970. That task might not prove as great as imagined.

"They like Americans so well it is embarrassing," Dr. Damon said. "They remember us from World War II."

One of the things they remember is the generous gifts Americans brought them. Such gifts may even have inadvertently helped foster the curious cargo cult.

This is a belief that some day ships will come from over the sea, laden with great treasures from white men.

Within the lifetime of the older natives, the Solomon islanders also practiced a curious custom — cannibalism.

Knowledge of this practice must have given some of the MGH team members pause before deciding to go. Dr. Lot B. Page, an assistant physician at MGH and chief of medicine at Newton-Wellesley Hospital, went in both 1966 and 1968.

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Dr. Albert Damon measures a native as part of a study aimed at clearing up a mystery about the origin of the Solomon islanders.

Wearing Medical Service House Staff shirts a long way from home are from left, Drs. Melvin E. Clouse, Lot B. Page, Albert Damon and Robert C. Moellering. Photograph was taken during expedition to Solomon Islands.

MGH News

Vol. 27 No. 6 MASSACHUSETTS GENERAL HOSPITAL, BOSTON, MASSACHUSETTS December, 1968

He's a Most Interesting Fellow–Er, Computer

Sixty per cent of the college students taking part in an MGH-Harvard Medical School study thought they were "conversing" with a man when they were communicating with a computer.

Only 20 per cent realized they were involved with a computer and the rest could not decide, Dr. Michael T. McGuire, project director, said.

Twenty-four students from Greater Boston colleges took part in the amazing study, one of three similar ones the MGH and Harvard have been carrying out in the past four years.

The students "conversed" by typing on a teletype console located in an office of the MGH's Stanley Cobb Laboratories for Psychiatric Research. The console is linked to the Project MAC computer system, a research program at MIT.

None of the 24 participants knew they would be communicating with a computer. Investigators told them only that they were taking part in a communication experiment in which they would be conversing through a teletype machine.

"When instructions are typed to you through the machine," the students were told, "please start typing. Type about your feelings and thoughts, but do not say anything which would embarrass you. When you wish a reply to what you have said, press the response button twice."

All but five of the 24 students decided early in the exchanges whom they were talking to.

"Fifteen decided right away," Dr. McGuire said, "that they were talking to a graduate student, and nothing changed their minds regardless of the responses they received."

One such girl became frustrated because the "person" on the other end of the teletype was giving wrong answers to her questions. She slammed her arm against the teletype console in disgust and fractured the arm.

Another girl became a little puzzled at one point when the computer typed "CTSS not in operation." That message meant the computer was temporarily going off the air. Not to the girl, however.

"CTSS must be his initials," she thought. "He must be going for a coffee break."

The girl waited patiently until the computer system went back into operation.

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Mrs. Barbara Mayer, a technician in the Bacteriology Laboratory, culturing bacteria.

Medicine Faces Challenge from "Harmless" Germs

Two MGH scientists are concerned that unless medicine rises to the challenge, man will increasingly fall prey to his own "harmless" bacteria.

Dr. Arnold N. Weinberg and Lawrence J. Kunz, Ph.D., believe that those germs lying naturally and generally safely within man are becoming one of the main causes of infectious disease.

"We have to meet this challenge to prevent new problems of infections with our own bacteria," Dr. Weinberg said.

An assistant physician at the hospital, he is an associate in medicine at Harvard Medical School. Dr. Kunz is bacteriologist at the MGH and assistant professor of bacteriology at the medical school.

Until recently, "infectious disease" to a doctor has meant whooping cough, diphtheria, polio and the like. Vaccines are helping virtually to stamp out such diseases. New vaccines are likely to end as serious threats other ills such as mumps and measles.

All such ailments are transmitted from one person to another.

What Dr. Kunz is seeing increasingly in his bacteriology laboratory are germs that hide under impressive names like Escherichia coli (E. coli), and klebsiella.

"There is a mammoth number of bacteria," Dr. Weinberg said, "in the colon, nose, mouth, under the fingernails and on the skin.

"It happens within the first hour of life that you begin to get these bacteria."

Some of these germs serve a definite purpose such as producing vitamin K. While others do not seem that valuable,

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EDITORIAL:

Coping with Mother Nature's Seesaw

Nature loves a balance. Every one of her creatures originally had some purpose. Thus, there are miniscule animals to feed on the ocean's algae, small fish to eat those tiny animals and larger fish to eat the smaller ones. There are frogs to eat insects, snakes to eat frogs, and animals like the mongoose to kill snakes and rats.

Any change in nature's careful balance can prove a disaster. Thus, the mongoose was brought to some of the West Indies to kill off ravaging rats. In the strange environment, however, the visitor posed a threat to other creatures which never before faced a mongoose. Result: near extermination of native ground-resting birds.

So it seems with the germs within man. Man begins to harbor them from his first hours on earth. Some are known to help their host in various ways. In other cases, the direct benefits are unknown to medical science. Whether or not each germ has some individual purpose, it is fairly certain that bacteria, like larger animals, live in delicate balance.

In a front-page story in this issue, two MGH scientists, Dr. Arnold N. Weinberg and Lawrence J. Kunz, Ph.D., describe what can happen when man upsets that balance in treating patients. The purpose of medical advances is, of course, to prevent and cure disease. Like importing the mongoose, physicians introduce antibiotics into the human to kill bacterial infections. Properly used, the drugs do well, curing serious illness and even preventing death. In the process, however, the same well-intentioned drugs usually kill some other bacterial residents of man's interior. Such annihilation can knock Mother Nature's balancing act right off her seesaw. The result can be as minimal as mild diarrhea or as dangerous as blood poisoning.

The front-page story lists other ways in which well-meaning medical science can unbalance nature. In most cases, those steps by physicians prove well worth the risks. The net result is often the prolonging of life and the preventing of crippling disease.

The fact remains that in helping man live longer, the new drugs and techniques substitute other ways for him eventually to die.

Drs. Weinberg and Kunz warn that these new illnesses are almost certain to become an increasingly major threat. In no way do the two scientists want physicians to curtail the careful use of modern drugs and treatment. What they seek instead are methods of preventing or controlling the new forces unleashed by upsetting nature. To be sure, any new treatment would likely create yet a new imbalance. But such a step would lead mankind still further along the path to a healthier and longer-lived society.

News Analysis

Doctor Shortage Talk Stirs the Profession

A lay-it-on-the-line talk about the nation's critical physician shortage is stirring favorable reaction from doctors around the country.

Dr. John H. Knowles, general director of the MGH, drew a standing ovation when he delivered the speech last month before the annual meeting of the Association of American Medical Colleges. Since then, the ripples have been continuing to spread.

Comments generally express delight at the fact the talk struck at what many of those commenters term the "real issues." The hope is that Dr. Knowles' call to arms will stir some of the responsible groups from their slumber.

Until now, medical schools have taken the brunt of the blame for the physician shortage.

Nobody had looked at the issues from the viewpoint of the specialty boards that set standards of medical care in the public interest.

Dr. Knowles himself decided to survey the nation's 18 specialty boards. His Houston talk summarizes a 58-page report scheduled for publication in February in the Journal of Medical Education.

The study concludes:

"The reluctance of many specialty boards to concern themselves with manpower shortages within their field is paradoxical and cannot be defended rationally."

Dr. Knowles said the majority "considered it quite outside of their area of interest or responsibility to consider the broad question of manpower shortages. . . . The apparent lack of knowledge and lack of interest in or responsibility for manpower shortages was surprising to me."

Turning to the vast shortage of general practitioners, Dr. Knowles blamed two groups:

"The most powerful deterrents to the establishment of the specialty of general practice . . . or to the development of primary physicians would appear to be the American College of Surgery and the American College of Physicians with their respective medical school departmental chairmen.

Continued on Page 5

OPINION:

Words and Wars

A page-one story in this issue of the *MGH News* describes some of the difficulties involved in conversation.

The computer study on which the article is based drives home once again how complex a thing communication is. And no wonder. The article reports there are believed to be more word combinations possible in English than electrons in the universe. Such a situation allows for a plethora of possible errors.

It is obvious that individuals need to express their ideas clearly to get along well in the world. If a husband says he will be home "early," the couple may wage unarmed warfare when it develops the meaning of early is not the same to both of them.

This sort of misunderstanding occurs frequently between husband and wife despite their close knowledge of how each expresses ideas. When the conversation includes several members of a family, the possibility for misunderstanding multiplies. This is true because of the increased number of people conversing, and because of the likelihood of less close knowledge of how each expresses ideas.

Extend the conversational group to, say, a town meeting or the United States House of Representatives. Under such circumstances — especially the town meeting — misunderstandings begin to fission.

Until now, this entire column has been based on the assumption that everyone speaks the language of infinite word combinations — English. When one adds the dimension of different languages, the possibilities for error magnify hopelessly. Even expert translators make serious errors of understanding. Conversation in which some of the participants are weak in the tongue being spoken or are dependent on translators add yet more to the difficulties.

All of this helps explain why international organizations such as the United Nations encounter so many problems. Until mankind learns to refine the art of communicating to a level far beyond the present capability, international problems will continue to abound.

Misunderstandings between husband and wife lead to arguments. Misunderstandings between nations lead to war.

He's a Most Interesting Fellow–Er, Computer

Continued from Page 1

"He's finished his coffee and is back," she told a researcher.

Independent investigators rated four of every five responses made by the computer as appropriate. Every fifth response just didn't make sense. Yet even that fact failed to change the minds of the 60 per cent who decided they were talking to a person.

"That shows," Dr. McGuire said, "that once someone gets a set or idea, it is exceedingly difficult to dispel. All sorts of information can be explained in terms of that idea."

This concept has long been accepted by psychiatry, but this is believed the most thorough demonstration.

Strong Suggestions

The three related studies have outlined some other strong suggestions.

"There are implications," Dr. McGuire said, "about when we think we know what is going on in someone's mind. Words imply a precision they don't have. It could actually be a personal way of interpreting those words."

He gave as an example the sentence, "I have a job that has little responsibility."

"In one culture this may be thought of as an ideal job," Dr. McGuire said. "Whereas, in another culture, responsibility and achievement may be all important."

This concept of interpreting information in terms of one's background is one that will prove invaluable to educators. A white, middle class teacher would fail to reach a ghetto youth, for example, until he understood the youth's culture. He then would be able to put his ideas across in a way that was comprehensible to the youth.

Limitations of Computer

Dr. McGuire is an assistant in psychiatry at the MGH. Aiding him with various aspects of the three studies were Dr. Gardner C. Quarton, psychiatrist, Stephen Lorch, an assistant in mathematics and psychiatry, Barbara May, research analyst, and Roger Coleman, research assistant.

To set the record straight, the group emphasized the limitations of the computer:

"Even though this study happens to be exchanges between people and a machine, it is used primarily for research, and it is not anticipated that the computer will replace the psychiatrist."

Dr. McGuire said it would probably prove impossible to program enough information into a computer to replace a psychiatrist.

"There are believed to be more word combinations possible in English," he said, "than electrons in the universe."

Dr. Michael T. McGuire looking over computer "conversation."

Now "Harmless" Germs Challenge Medicine

Continued from Page 1

they all normally live in the body in perfect balance. Everything else being equal, as long as they remain in their normal quantities and sites, they will not cause disease.

Once that delicate balance is upset, however, trouble can follow. Anything like certain antibodies that kill off many of a particular family of germs is a potential troublemaker. Other bacteria that might have been held in check are then free to rampage.

The result is what is popularly called opportunistic infection: infection that comes from bacteria that seem almost to lie around awaiting the opportunity to cause disease in a weakened patient.

Why does man seem increasingly to be getting diseased from his own germs? Drs. Weinberg and Kunz listed several reasons.

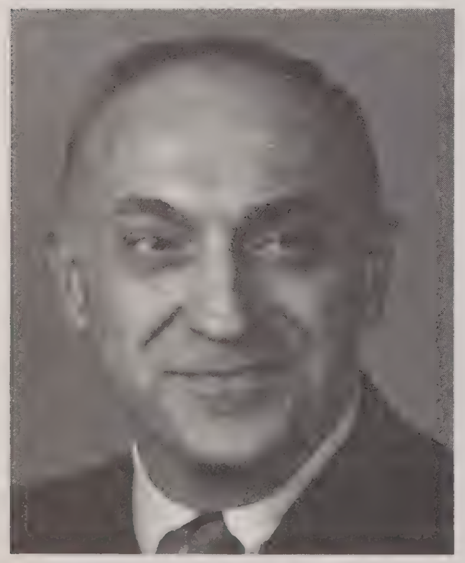
"For one thing," Dr. Weinberg said, "this is the era of antibiotics.

"An antibiotic like tetracycline which is used to treat an E. coli infection of the urine may alter the same family of bacteria normally residing in the intestines; and small numbers of staphylococci may be unleashed and produce a staphylococcal infection of the bowel.

Life-Threatening Infections

"Patients who receive antibiotics are often quite run down and thus perhaps even more susceptible to other infections. Therefore, we have to be careful in choosing specific drugs and observing the patients closely during treatment."

Even with such precautions, life-threatening infections may complicate the use of these valuable medications.



DR. LAWRENCE J. KUNZ

Other drugs that upset the balance between a person and his normally harmless bacteria are immunosuppressives (medications that suppress the body's normal foreign protein rejection system), and steroids like cortisone.

It isn't only drugs, however, that upset nature's balance. Radiation, a deep cut, a collection of fluid, an injury and even a foreign body such as a surgical stitch can cause trouble.

"Any of those factors that alter normal nutrition in a given area make the patient susceptible to infection in that region," Dr. Weinberg said.

Problem of Old Age

Another problem is old age.

"More people are living longer," Dr. Kunz said. "As they age, they suffer normal wear and tear. Through age or surviving long illness, their nutrition is compromised, and they become susceptible to their own bacteria.

"Someone in whom long illness has impaired lung function is more likely to get a pulmonary (lung) infection."

When modern medicine pulls a patient through a stroke, he may be left with difficulty swallowing. That problem can lead to aspirating mouth germs, for example.

Lead to Pneumonia

When the lungs are unable to get rid of the material in the usual way (like coughing), that can also lead to pneumonia.

As modern surgical and medical know-how pulls burn patients through the initial period of shock, they often fall prey to their own bacteria. This is partly because the skin that normally forms a protective barrier is too damaged to keep out bacteria. A person's own yawns, sneezes and coughs, and excreta can thus send usually harmless germs onto the burned skin where a potentially fatal infection can begin.

"More and more," Dr. Weinberg said, "we are doing things that prolong life.

"In essence we may be preserving a patient weakened in other ways that make him more vulnerable to infection from bacteria which reside within himself."

DR. ARNOLD N. WEINBERG

Pigs May Shed Light On Liver Transplants

A former MGH researcher has uncovered some surprising findings about pigs that may shed new light on liver transplantation.

Of the organs transplanted in man so far, the liver has proved one of the most difficult. Only a few such procedures seem to be succeeding.

To learn more about the problems, Prof. Athol G. Riddell, chairman of the University of Bristol, Royal Infirmary in Bristol, England, has been transplanting livers between pigs.

Rejection of the donor organ is the problem surgeons fear the most in nearly every type of transplant. That casting-off process results from nature's attempt to protect man from any tissue or organ foreign to him.

To prevent a man from rejecting a new organ, physicians treat him with immunosuppressives, drugs that tend to suppress the rejection.

Dr. Riddell's group, however, has found that many of these donor livers have seemed to escape severe rejection, and others have shown no signs of the process even though immunosuppressive drugs were not used.

The liver of one such pig, "Percy," showed no rejection two years after his surgery.

"From what we have seen in the pig," Prof. Riddell said in a Richardson lecture at the MGH, "we have hopes that maybe the rejection process of the liver in man may not be as difficult to control as renal (kidney) transplant.

"Because of the rapid deterioration of liver tissue in association with a patient's death, it is going to be extremely difficult to get really good livers for transplantation, and unless we get really good livers, it won't become a truly repeatable procedure until we have some effective means of long-term preservation of donor livers."

Dr. Riddell said he is puzzled about why the liver should be less likely than other organs to be rejected.

"Maybe there is something in the liver that protects it," he theorized.

Prof. Riddell was a clinical and research fellow at the MGH Department of Surgery from 1952 to 1954. He described his liver transplantation work in an Edward P. Richardson Lecture held in the Shrine Auditorium. Dr. Richardson was the first full-time professor of surgery at the MGH and was appointed in 1922.

He was John Homans professor of surgery at Harvard Medical School. With J. H. Means, he authored "Diseases of the Thyroid," and contributed articles on surgery to a number of professional publications.

During World War I, he served with the First Harvard Medical Unit in France as a temporary honorary major. He was commissioned a captain in the Army in 1918.

A cum laude graduate of Harvard Medical School, he was an MGH house officer in 1906 and 1907. He died in 1944.

Doctor Shortage Talk Stirs the Profession

Continued from Page 2

". . . The American College of Surgery and general surgeons are loath to permit an expansion of general practice into the field of general surgery mainly in the interests of maintaining quality, but also perhaps for economic, political and social reasons. Yet both public and profession at large are increasingly concerned with the decline of general practitioners or those who can function as the primary contact for the patient.

". . . Personally, I feel that the development of departments of family or comprehensive medicine charged with the production of 'primary physicians' could be one of the most exciting and important developments of the modern era. I do believe that programs could develop (although this is not likely) within existing clinical departments and particularly if the field of teaching hospital is enlarged through extensions to the urban community. . . . A major revolution in faculty attitudes and academic reward systems will have to occur in either instance."

Merely increasing the number of physicians will not necessarily solve the shortage, Dr. Knowles said. The increase will have to come in the needy geographical areas and in the proper specialties.

"The health needs of some 40 million impoverished Americans, living largely in urban ghetto areas are staggering," Dr. Knowles said. "As effective demand increases from this group, manpower shortages will become even more acute."

A New Cycle

Dr. Knowles predicted the end of a great cycle which has seen a beneficial expansion of science in American medicine. "We are beginning a new cycle," he said, "which will see us pay equal attention to the social problems of medicine."

He called for comprehensive, multidisciplinary studies of manpower shortages in each specialty.

To make the studies, he urged efforts pooled by the specialty board, the professional society, the National Institutes of Health and its appropriate division, the Bureau of Health Manpower and Health Services Research, the American Medical Association and the Association of American Medical Colleges, economists, political scientists and vocational educators.

Dr. Knowles praised several specialties for "substantial studies" on the shortages. Named were pathology, psychiatry, neurology (nervous system), and dermatology (skin). Listed as having begun promising studies are pediatrics, orthopedic surgery and urology (urinary tract).

Skimpy at Best

"Studies in obstetrics and gynecology, radiology and anesthesiology seem skimpy at best for such obviously important areas," Dr. Knowles said. He termed surprising the reply from the organization of eye, ear, nose and throat specialists (American Academy of Ophthalmology and Otolaryngology) that it was not its business to concern itself with the manpower problems in its respective specialties.

"It is particularly notable," Dr. Knowles said, "that no formal studies have been attempted either in internal medicine . . . or in general surgery. . . .

"Generally speaking," he added, "the studies lack uniformity and are noted for their lack of the kinds of data that the experts of other disciplines such as economics and the other social sciences would wish to know. Furthermore, constructive solutions for the medical administrator to implement are weak."

CHRISTMAS IN THE 30S
This is the way the Moseley Building looked in the 1930s. How many changes can you spot?

Part II

McLEAN HOSPITAL: NOW AND

(The following is the second and final part of a series commemorating the 150th anniversary of the admission of the first patient to McLean Hospital. Editor's note).

* * *

When the forerunner of McLean Hospital admitted its first patient 150 years ago, three hours of conversing with "the committee" was all that was necessary.

Today, the process at McLean Hospital in Belmont involves many committees, many decisions and much time. The committees consider all the different aspects of the patient's possible stay at McLean.

The first step of the admission procedure, as outlined by Dr. Francis L. A. de Marneffe, director, is businesslike and similar to that employed at any hospital:

"The family or the referring physician calls us, and the pre-admission office obtains such information as the patient's age, kind of illness, and reason for requested admission."

But from that point on, the procedure is an important part of the overall picture of concerned patient care.

If admission is deemed appropriate, a date is set, and the patient arrives, accompanied by spouse or parents. Upon admission, what is he likely to find?

McLean today is a 256-bed hospital situated on a 320-acre plot in the Waverly section of Belmont. It embraces 40 buildings, including 12 residence units housing about 20 patients each.

Array of Professionals

The patient will find that there are three times as many staff members as patients, and he can expect to be cared for by an array of professional people. He will work with psychiatrists, residents, nurses, nursing aides, social workers, and clinical psychologists, as well as with art and music instructors and occupational and recreational therapists.

He will discover that McLean is a teaching hospital of Harvard Medical School and is affiliated with a number of other Boston area schools and hospitals as well as being a division of the MGH. Therefore, in addition to the professionals, there are a great many persons training in mental-health-related fields at McLean.

McLEAN HOSPITAL (Photo by Harry T. Holbrook)

Upon admission, the patient will find himself assigned to one of six units, a system the hospital hopes to change in the near future, as the new admissions unit opens. The medical staff felt that it would be better to have a single admission unit to which all patients would originally be assigned. They could then be transferred to a more permanent unit once early problems had been overcome.

The patient can expect to stay about 12 weeks, the average period of hospitalization. His treatment, however, is likely to continue beyond this period.

Flexibility Stressed

The hospital is flexibile, and the patient's program is adapted to his individual needs. Daily activities may include arts and crafts, music, sports and games, patient environmental group meetings, voluntary jobs, and individual and group psychotherapy. Each patient has certain responsibilities around the hospital which he is expected to perform, like making his bed, cleaning, or gardening.

This flexibility underlines the new trends in psychiatric care which have emerged in the past fifty years. An optimistic outlook pervades the halls of McLean now, whereas not many years ago, the treatment of a patient was secondary to his custodial care.

Need Human Interaction

The stress today is on the need for human interaction. Dr. de Marneffe pointed out that it is in this area in particular that new medications have played an important although sometimes overrated role.

Today the relation of a specific action to changes in a patient's condition are recognized and used to the patient's advantage.

McLean recognizes that withdrawal from the reality of day-to-day living is one of the symptoms of mental illness. The hospital therefore works towards returning patients to a normal life by encouraging them to take part in real life situations, often planned by the patients themselves.

For instance, two of the hospital's most disturbed groups (as well as less disturbed patients) frequently make excursions into the city for special events, concerts, movies, etc. During the sum-

IN THE YEARS TO COME

mer, the most disturbed male patients' group spent five days camping in New Hampshire, joined by guests from another group for one day. Fund-raising and other details were carried out by patients with staff support; similar plans are being made for a weekend of skiing this winter.

Research

Research continues to grow in sophistication, and with increasing discoveries come continued changes in patient care. At McLean, one group of scientists is investigating the chemistry, function, and structure of the brain in normal and mentally ill persons, and others are carrying out research projects in clinical physiology and in the social and biological sciences.

Care today also emphasizes the least possible disruption in the patient's life. Admission of a family member to a mental institution is often a family crisis. Dr. de Marneffe pointed out that it is the hospital's responsibility to do all it can to counteract the effects of such a crisis.

"We need to fight the lethargy which is an expression of depression that often results from admission to the hospital," he said.

"A hospital needs to be different from home, but at the same time, you don't need the loss of contact with the outside that is antitherapeutic. Hospitals must avoid the loss of contact with meaningful people; in fact, they must foster those relationships."

As a result, visiting hours have been extended to run from 10 a.m. to 10 p.m. to allow friends and family who work to visit, and to avoid the hospital-like atmosphere of short, regulated visiting hours.

Volunteers Provide Change

Breaks from possible over-therapy are provided by volunteers who supply a refreshing change by showing a nonprofessional interest in the patients.

In addition, the rehabilitation center is set up like a village green, with shops, soda fountain, laundry, meeting rooms and recreation area. There is also a library, printing press, photography laboratory and a "stage" for concerts, plays or movies.

Adolescents continue their schooling in the Arlington School, a fully-accredited college-preparatory high school on the grounds. It has an enrollment of about 50 students, all of whom are receiving treatment through the hospital. The school allows patients to keep up with their peers and to return to schools in their communities with as much ease as possible.

A day care center provides outpatients with the opportunity to participate in the daily activities at McLean while living at home with their families, and a night care program allows patients to sleep at McLean but attend school or jobs away from the hospital.

Recent Changes

Always a leader in the field of mental health, the hospital strives continually to better its methods and its facilities.

In the last 15 years, the services of the hospital have expanded to include the social work and social science departments. A residency training program was developed, and the day care program was established to serve both outpatients and inpatients who could be discharged from the hospital but needed continued treatment.

Within the last five years, the hospital has opened the new rehabilitation center, the first new patient building in almost fifty years. And the outpatient clinic was opened to serve individuals needing psychiatric treatment who were unable to afford private psychiatrists' fees.

This year, McLean's nursing school graduated its last diploma class, but training of psychiatric nurses will continue on a greater scale than before.

Most Serious Problem

Because a private, non-profit hospital depends on the fees it collects from its patients, McLean's most serious problem over the years has been its lack of provisions for middle and low income groups.

On Feb. 2, 1817, an "address to the public" was adopted by the trustees "to obviate the impression" that the Asylum was designed only for the wealthy. While that impression lingers today, McLean is striving to dispel it. The Outpatient Clinic has provided a big boost in this effort, and the hospital has also reduced rates for needy in-patients.

DR. FRANCIS L. A. de MARNEFFE

For the future, increasing services for middle and low income patients are under consideration as part of a cooperative plan with the state. The possibility of providing an evaluation center for the Waltham-Watertown-Belmont district, as part of a comprehensive community mental health facility, is also under consideration.

Care for Children

Most important, McLean, which has treated only adolescents and adults for the past 150 years, is establishing a child psychiatry unit to be built on the grounds within the next two years. The project is being carried out with the cooperation of the Hall-Mercer Children's Hospital in Philadelphia. This is a major step: it will not only help to alleviate the state's shortage of treatment facilities for mentally disturbed children, but it will also contribute to a greater understanding of mental illness. Speaking of the new unit, Dr. de Marneffe said:

"Since so many of the factors contributing to emotional illness in adults originate in childhood, the establishment of the Hall-Mercer Children's Hospital, in close affiliation with McLean, will contribute in a significant way to our understanding of emotional illness."

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Teeth Provide Clues When Fingerprints Fail

On the night of Friday, Oct. 25, a passenger plane crashed into a hillside in Lebanon, N. H., and 32 people were dead, their bodies unrecognizably burned in the flames which followed. It was a sight most people would walk away from, but Dr. Edward B. Seldin of the MGH walked right into the thick of it. Responding to a call from the airlines, he volunteered to spend an entire day identifying the remains.

His method, dental identification, or matching teeth with dental records, is a common one, but it is no less important for its frequent use. This incident dramatizes the technique, which has found increasingly widespread use as a means of identifying bodies so mutilated that they are otherwise unidentifiable.

Dr. Seldin, who received his D.M.D. from the Harvard School of Dental Medicine in June, is an intern in oral surgery here in his first year of a three-year program including internship and residency. He explained in an interview his role in the identification process:

"I had records of treatment from the victims' local dentists," he said, "including charts, X rays, and verbal descriptions of significant features.

"I assembled that information, and I examined all the human remains and made similar dental charts on them. It was then simply a matter of matching charts. It was kind of a process of trial and error. It just involved ruling out impossible cases."

Other clues helped. In some cases, he knew the sex of the victim. But the dental information was the most important.

"Any dental restoration is helpful in identification," Dr. Seldin said, "especially gold restorations or root canal work."

Even One Tooth Helps

Even one tooth can sometimes identify a person, if the dentist has an X ray of that tooth in his records. Dr. Seldin explained that it's a matter of taking multiple X rays of the victim's tooth in different positions to see if one can be matched with the original X ray.

DR. EDWARD B. SELDIN

In this tragedy only eight victims could be identified through their fingerprints. Dr. Seldin was able to identify positively 14 persons through dental identification. He was careful to point out, however, that the situation was not unique, and to explain why the method is, in fact, commonly used.

"Teeth survive the ravages of fire and water, which produce body decomposition," he said. "The teeth can remain when nothing else is left." He added that the armed services use this method extensively because of the nature of deaths incurred by their men.

Dr. Seldin characterized the experience as "unique if somewhat unpleasant."

Famous Harvard Murder

Dental identification has a long and a rather colorful history. One of the earliest recorded incidents of dental identification is the now-famous Parkman-Webster murder at the old Harvard Medical School in 1849.

It seems that Dr. John White Webster, a Harvard Medical School chemistry professor, borrowed some money from Dr. George Parkman, also a Harvard professor. Dr. Webster was apparently lax in paying it back, and one afternoon Dr. Parkman paid him a visit in his lab.

There was an argument and a fight, and Dr. Webster killed Dr. Parkman. To dispose of the body, he cut it in pieces with his jackknife and fed it, bit by bit, into a furnace.

The process took quite a while, and a janitor, suspicious of Dr. Webster's actions, and knowing of the mystery surrounding Dr. Parkman's disappearance, snooped around Dr. Webster's lab and found remains of the body which had not yet been burned.

The parts could not be identified as belonging to Dr. Parkman until Dr. Nathan Keep of the Harvard dental school identified a set of false teeth he had made for Dr. Parkman which were found among the remains.

MGH News

Vol. 28 No. 1 Massachusetts General Hospital, Boston, Massachusetts January, 1969

MGH Scientists Discover New Inherited Disease

Rəading and Sqeaking: The Иeɔesƨary Sʞills

Peter L. is nine years old, is in the third grade in a public school in Boston, has an I.Q. of 120, and cannot read.

Lisa S. is eleven, is in the fifth grade, has an I.Q. of 111 and stutters so badly that her teachers have stopped calling on her to recite.

In an age in which communication is being recognized as the crucial element in every area of human interaction, these children, grouped together because of their difficulty in language function, present a special problem.

That problem is being handled at the MGH by a small but dedicated and active group whose headquarters on the third floor of the Outpatient Building are signaled by a brown and white sign which says simply: Language Clinic: Speech and Reading Clinic. A division of the Neurology Service, the Language Clinic specializes in the evaluation and treatment of patients like Peter and Lisa, who are usually referred by the family doctor or the school.

Under the general direction of Dr. Vincent Perlo, neurologist, the tiny clinic is a beehive of activity: 15 patients are seen each week for evaluation; 35 children and 10 adults come in three times a week for reading therapy, and 46 children and 37 adults make visits once or twice weekly for speech therapy.

The Reading Clinic deals almost exclusively with a disorder known as developmental dyslexia. Peter's case is typical. He exhibits above-average intelligence, is popular and often is chosen a leader by his peers. He has no trouble with arithmetic except that he sometimes reverses figures in writing, and yet he cannot read. He has a poor visual memory and exhibits visual-spatial confusion. He has trouble distinguishing between a "b" and a "d" and between a "u" and an "n," and he reverses letters in words, reading "form" for "from" and "was" for "saw."

Jim Ferro, 6, plays with blocks used in an I.Q. test.

The disorder, seen four or five times as often in boys as in girls, presents a particularly thorny problem because it is so poorly understood. Some educators, in fact, deny its existence, and a few have never heard of it. Even among neurologists who have done considerable research into dyslexia, the condition is not well understood.

This is because language is a brain function peculiar to man. Research is held back by the fact that animal brains

Continued on Page 4

A new inherited disease has been discovered by an MGH group.

Ornithinemia is the third new ailment co-discovered by the late Dr. Mary L. Efron.

Although the latest one dates from 1965, the posthumous report will be described for the first time in the January issue of the *American Journal of Diseases of Children.*

The only case of this new disease, a form of mental retardation, is that of a Marlboro boy. He was 1½ when he first came to the attention of Dr. Efron and her group at this hospital's Laboratory for Amino Acid Metabolism in the Joseph P. Kennedy Jr. Memorial Laboratories for Mental Retardation.

A patient of Dr. Peter B. Rosenberger here, the child had puzzling symptoms. Dr. Rosenberger sent a blood sample to Dr. Efron.

She discovered the elevation (high concentration in the blood) of an amino acid, one of nature's building blocks. After intensive study, the laboratory also discovered in the blood a compound called ornithine.

In addition, an unusually high amount of ammonia turned up in the blood. Since ammonia is the end product of amino acid breakdown, the researchers felt they were on the right trail.

Their findings were compatible with those in diseases in which the body is incapable of breaking down proteins into urea, a waste product found in urine.

A low-protein diet was prescribed, and a remarkable change resulted.

Before treatment, the child was very

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EDITORIAL:

Asking the Right Ethical Questions Now

Man is approaching the time when he will be able to create human life in a test tube. Before that day, however, other amazing possibilities loom likely.

Genetic counselors already are able to tell parents of their chances of producing a mentally or physically defective child. More and more, however, these counselors are going beyond a mere recitation of nature's odds and advising against having children. Some scientists envision a day when the state will use genetic knowledge as a basis to prevent some marriages or to warn some couples against childbearing.

What about a woman who has become pregnant and wonders whether her child is defective? Already the infant science of fetology has toddled a few halting steps. Determination of an increasing number of diseases is possible while the unborn child lies within its mother's womb. Knowing that a fetus will be born defective presents another moral problem. If the defect is serious enough, should the parents and/or society be allowed to decide that the infant should not be born? The question of such state control seems more compatible with dictatorship than democracy. Yet, might the force of the population explosion pressure society in that direction?

Again, geneticists are exploring ways to manipulate human life. Eventually, they may be able to produce a Beethoven or a Shakespeare on command. To what use will such capability be put? Will parents be allowed to decide the endowments of their unconceived son? Or will the state decide on the basis of a quota system that will order a designated number of physicians, engineers, architects, lawyers, etc.?

In an article on page six of this issue, Dr. Sydney Brenner alludes to such moral questions. A world-renowned molecular biologist, he predicted in an interview that the biological time bomb that will come with being able to manipulate human life will not explode for another generation. But Dr. Brenner warns that society cannot afford to put off a debate on the moral issues. We agree. The issues involved are complex. Even the most brilliant specialists range over the full rainbow of opinion on what should be done.

Can these great and grave moral issues be left solely to the decision of experts? We think not. Dr. Brenner argues cogently, and we agree, that all mankind must bear the responsibility. Only a long and public debate can drive these issues home to the non-scientist. Since the outcome will weigh heavily on his children, he must take part. And the earlier the debate starts, the earlier and wiser the decisions may prove. Some of the questions asked some 2,400 years ago in Plato's "Republic" cannot wait even 24 years for an answer.

A Personality That Shines like a Meteor

(The following eulogy will appear in the January issue of the *American Journal of Diseases of Children.* The issue is a memorial to Mary Efron, MGH assistant in neurology and biochemistry, and Harvard Medical School assistant professor of neurology, at the time of her death in 1967 at age 40. The author is Dr. Raymond D. Adams, chief of the Neurology Service at the MGH, and Bullard Professor of Neurology, Harvard Medical School. Editor's note).

Once in every generation or so there looms over the medical firmament a personality that shines forth like a meteor, to briefly illumine its environment and thereafter to be remembered by all who behold it.

Such was the personality of Mary L. Efron. Possessed of a simplicity of character, a great warmth and capacity for sincere friendship, an intrinsic kindness that marked all of her actions with people, an incredible energy and indomitable enthusiasm and above all a keen intelligence — she was truly an unforgettable colleague.

Coming to neurological medicine with a strong background in chemistry, strengthened later by an intensive training in the application of analytical chromatographic techniques in Professor Dent's laboratory, she was able in a short time to open up new possibilities in the study of nervous disease. These skills and the new diseases which she discovered and the old ones which she elucidated would alone have assured her place in medical history. But it was her approach to life and to her professional work that immediately arrested one's attention.

Confronted with a new problem in amino acid metabolism, she had a phenomenal capacity to think within a few seconds of all the possibilities of its solution. Ideas virtually erupted from her mind, and her critical faculty unerringly brought her to choose the ones most likely to be correct. As she proceeded in her analysis, she would outline all of the steps of a research program and, if necessary, would make any required technical innovations. This accounted for the fact that her own laboratory looked more like a room in a woman's garment shop with tables, papers and sewing machines, than the conventional chemistry laboratory with bottles of reagents lined up in neat rows. Her agility and quickness of mind always enabled her to be working out

Continued on Page 3

three or four problems at once, rather like an expert chess player who likes the challenge afforded by three or four adversaries at the same time.

Mary Efron's talent for scholarship was evident in her persistent study and investigation of disease. At the same time she exemplified the other attribute of a teacher which Carl Linnaeus declared to be of utmost importance — her ability to encourage the clever pupil. She was surrounded by them; her laboratory was a mecca for young scientists. She was in touch with everyone in the world who shared her interest in the study of metabolic diseases of the nervous system.

In this dedication to science, Mary Efron was completely selfless. Never was she too preoccupied with her own projects to pause and help others who wished to consult her about their problems. She would give as generously of her ideas as she would if the problem were her own. The successful solution was the reward; personal credit was never a consideration. The degree to which she has helped others will never be known, but some idea of the high esteem in which she was held in the world of medical science and the debt many owed to her is attested by the eagerness of gifted investigators from all over the world to contribute to this volume.

It was Mary Efron's destiny as a gifted woman scientist to leave neurological medicine different than she found it; and every person who came to know her blithe spirit has been left a slightly better person.

DR. MARY EFRON

Scientists Discover New Inherited Disease

Continued from Page 1

difficult to manage because of seizures and other difficulties. Added to his mental retardation, these symptoms posed a problem.

"Even with medication," Dr. Vivian E. Shih, Dr. Efron's colleague, recalled, "his seizures were difficult to control. All of a sudden, he would let go of something he was holding, and his head would drop. This happened many times a day.

"He was so fussy, you couldn't go near him. He would scream and be very unpleasant."

The child also lacked coordination. After treatment with the low-protein diet, he gained coordination.

Now he is 4 years old.

"He is quite a different child," Dr. Shih said. "Everyone is pleased. He goes to nursery school and is very delightful. Now he smiles and talks to people."

The child is still retarded. He has a distinct chance, however, "to end up as educable." Although retarded, an educable child has a high enough I.Q. to profit from special education.

Carried on Work

Working with Dr. Efron in identifying his disease were Dr. Shih and Dr. Hugo W. Moser, assistant neurologist at the MGH, assistant professor of neurology at Harvard Medical School, and director of research at the Fernald School in Waltham.

Dr. Shih is principal author of the *Journal* article. Since Dr. Efron's death a year ago, Dr. Shih has carried on her work with Dr. Harvey L. Levy.

Both other diseases co-discovered by Dr. Efron also involve defective amino acids. In 1962, hyperprolinemia was described by Dr. Irwin A. Schafer of Western Reserve University in Cleveland, Dr. Charles R. Scriver of McGill University in Montreal, and Dr. Efron.

A low-protein diet seems effective in treating the child with hyperprolinemia, which numbers mild mental retardation among its symptoms.

Dr. Efron described a third amino acid disorder she called hydroxyprolinemia. Co-discoverers were E. May Bixby, Ph.D., of the Department of Research at Wrentham State School; Dr. Charles V. Pryles, formerly of Boston University School of Medicine, Wrentham State School and Boston City Hospital, and Dr. Luz G. Palattao of the Department of Research at Wrentham State School.

All Are Rare

Hydroxyprolinemia is also associated with mental deficiency.

All three diseases are rare. At least, only a few cases have turned up.

However, only a few laboratories in the world have made an effort to identify such ailments. Those cases that do turn up almost inevitably are found after a child with puzzling symptoms is referred to a specialized laboratory.

"We may find such cases more common than we think they are," Dr. Shih said, "and if we find them early we may be able to give them treatment to prevent mental retardation."

Widespread screening to help this effort is now being done by the state of Massachusetts. Making the testing program possible is a technique Dr. Efron was instrumental in devising.

A way of identifying amino acids in blood, the method has gained worldwide usage.

Medical Detectives Here Clear Up 1932 Mystery

In 1932, an 8-year-old boy died at the MGH of a puzzling disease. It wasn't until more than three decades later that thorough medical detectives here diagnosed the ailment. The boy was mentally retarded. A dislocated lens made his vision poor.

What finally caused his death was a stroke, an illness more common to elderly people than to children.

In 1965, two Quincy sisters, 9 and 6 years old, were examined at the hospital. Both had the same symptoms that had puzzled physicians here in 1932.

A blood study under the direction of the late Dr. Mary Efron confirmed the suspicion of doctors that the sisters had homocystinuria. This is a form of mental retardation caused by an inability to break down two amino acids (chief components of proteins), methionine and homocystine.

When the medical sleuths confirmed the disease in the two girls, the doctors investigated their family history. The

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Rɘadinᵹ and Sqeaking: The Иeɔesƨary Sꓘills

Continued from Page 1

simply cannot furnish clues. As Dr. Lauretta Bender (originator of the Bender Gestalt test for perceptual functioning) has put it:

"Reading — language — is still a plastic function of the brain. It's the last skill acquired, in an evolutionary sense, and it's still not settled, not fixed."

The most widely accepted theory for some time has been that all language functions are controlled by the half of the brain that is opposite the more skilled hand. Thus, the left hemisphere controls language function in right-handed people and vice versa.

This theory was first proposed about a hundred years ago by a French surgeon and anthropologist named Paul Broca, and it has stood for many years. However, recent investigation suggests that the left hemisphere almost always controls language function — in left-handed as well as in right-handed people.

Therapy Successful

Well-defined theory or not, the fact remains that therapists can work with these children successfully. Dr. Perlo said that it is "beyond doubt that a child with this condition, assuming average intelligence, can be taught to read."

Mrs. Alice Garside, supervisor of the Reading Clinic, agreed with him, but she pointed out that therapy is neither easy nor clear-cut. "Treatment is difficult and takes great patience," she said. "Developmental dyslexia is not a thing that can be cured. It can be helped, and the dyslexic child *can* learn to read, though he is likely to remain a poor speller."

Elaborate Approach

Reading is taught through what Mrs. Garside calls a "synthetic-alphabetic-phonetic approach with multisensory reinforcement." It means using the elaborate phonetic approach of Anna Gillingham rather than the whole-word method often employed in American schools, and it involves going over letters, hearing them, saying them, writing them, and sometimes feeling them until sounds can be associated with them.

Mrs. Garside is assisted by a full-time remedial reading therapist and by 11 trainees who work with three children each three times a week.

Lisa's stuttering problem is only one of many dealt with by the Speech Clinic. Delayed speech disorders, poor articulation, lisps and other developmental speech and language difficulties comprise one area of clinical interest; and acquired speech problems make up another. Acquired speech problems may include aphasia (a total or partial loss of the ability to use words without accompanying effect on I.Q.) which often results from a wound or accident involving the cerebrovascular system, and disease-related handicaps like those of cerebral palsy and Parkinson's disease. Voice problems (both functional and organic), often referred from the Massachusetts Eye and Ear Infirmary, are also commonly encountered disorders.

Miss Wilma French, psychologist, jots down comments as Jim Ferro piles up blocks during a break in an I.Q. test.

Jeffrey Moll demonstrates his recently-acquired ability to write.

Two Kinds of Therapy

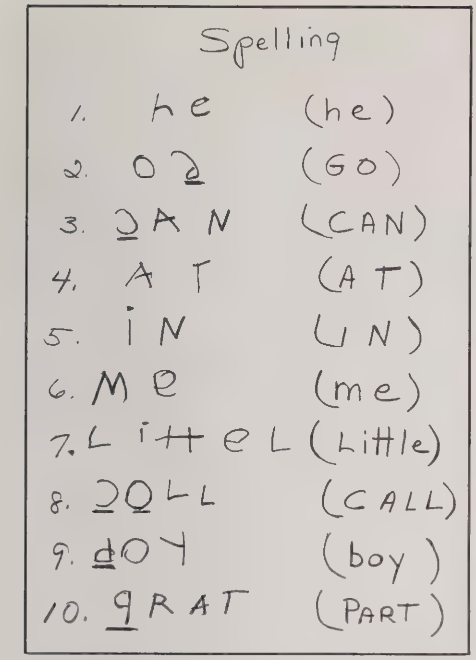
Individual and group therapy, the latter especially successful for aphasics, voice patients, and older stutterers, is conducted by two full-time and two part-time speech therapists, under the direction of Mrs. Julie Wheelden, speech supervisor.

Mrs. Wheelden is enthusiastic about the work that the clinic is doing: "The most exciting thing about the Speech Clinic," she said, "is the great variety of cases we have to work with. Each one is different, and therapy must be tailored to the individual patient's needs.

"Graduate student trainees from Boston University observe and carry out therapy under supervision, and the speech therapists meet weekly for comprehensive staff evaluations of new patients presenting unusual or complex problems in speech and language."

A Unique Feature

One of the unique features of the clinic here is its association with the Cortical Function Test Laboratory of the Neurological Service. When a child is first brought in for evaluation, especially if he has a reading problem, he is usually referred to the lab for testing by trained psychologists. This testing augments a medical exam done by the Children's Service and evaluations including family history done by the staff of the Language Clinic, usually by Dr. Perlo himself. After about a year



Spelling

1. he (he)
2. O∂ (GO)
3. ƆAN (CAN)
4. AT (AT)
5. iN (UN)
6. Me (me)
7. Littel (Little)
8. ƆOLL (CALL)
9. dOY (boy)
10. 9RAT (PART)

A spelling test given by the Cortical Function Test Laboratory, showing letter reversals typical of dyslexia. Correct words are in parentheses.

Miss Judith Lanoue, a reading trainee, helps Paul Bailey with the difficult words in his book.

of therapy, tests are readministered to evaluate progress.

The need for the Language Clinic has been demonstrated with increasing frequency in recent years. Started informally in 1934 under the direction of Dr. Edwin Cole, neurologist, and with the encouragement of Dr. James B Ayer, then head of the Neurological Service, the clinic was set up along lines approved by Dr. Samuel T. Orton, the father of dyslexia therapy. As such, it has served as a model for other clinics across the state and the country.

Aphasia Therapy Center

During the second world war, the MGH clinic was the chief center of the eastern United States for the development of techniques for aphasia therapy. As a result, the clinic obtained a fixed space in the hospital and a permanent staff.

Recently, there has been a surge of interest by the public in the problem of language disabilities. Two factors have combined to make it almost impossible for the clinic to cope with the number of patients applying for help.

The first is a gradual recognition by educators that specific language disorders do exist and can be worked with, and the second is the passage of a Massachusetts state law providing for the care of "perceptually handicapped children." Dr. Cole, who has retired from the MGH staff, will continue to work in this field through his recent appointment to the advisory committee for administering the new law.

These factors assure the already-busy clinic of an ever-increasing patient load. Education of teachers, long a clinic project, will be facilitated, and those involved in the program hope that educators and hospital staff now being trained through clinic experience here and elsewhere will establish a new spirit of cooperation long needed in this area.

Miss Catherine Welch, speech therapist, teaching Paul Robbat to say "sh."

Biologist Asks Public to Debate Ethics Now

A molecular biologist urges the world to start debating today the fantastic effects biology will produce on human life tomorrow.

Dr. Sydney Brenner, an English researcher, wants the layman to lead the debate which could decide the future of mankind.

"I don't know how to initiate this debate, but I do know it must be done," Dr. Brenner said. In Boston to deliver the MGH's Warren Triennial Prize Lectures, he expressed his concern in an interview.

Unlike some biologists, he believes the biological time bomb that will come with being able to manipulate human life will not explode for another generation.

"Yet, one has to start a debate over this early," he said, "to get people to realize that despite all the marvels of medicine maybe one should be rather depressed by some of them. . . . People have to be able to see a map of the consequences."

For the near future, Dr. Brenner envisions no major consequences from his own specialty, molecular biology. He sees the first major developments coming from the study of cells and the study of the nervous system.

Moral Problems

The ability to manipulate in mice, for example, the cells that determine sex poses all sorts of moral problems if applied to man.

Dr. Brenner urges the public to debate also such questions as whether to weed out the units of inheritance for conditions like PKU (phenylketonuria), a form of mental retardation.

"Are we going to be ruthless and decide we should interfere?" he asked.

He said science has in a sense offended several thousand years of religious tradition with discoveries like evolution. He now sees science as ready to offend as well 100 years of liberal tradition embracing the equality of man.

"Are people really equal genetically is a question that really has to be asked," he said. "This is the kind of thing people don't talk about. . . . These questions have to be asked by society, not merely by scientists."

Government Meddling

At the same time he urged a public debate, Dr. Brenner cautioned that such a debate can be manipulated, just as government agencies can manipulate the direction of science.

He said that the government meddles in science because it has the levers:

"We have seen all these levers work in the direction of science . . . in this whole incredible application of federal grants for research."

On a different tack, Dr. Brenner voiced a strong indictment of the Western World's education system:

"If one were a Martian who came to the earth and who understood biology and not sociology, he would be shocked to find that society devotes the least of its efforts and not the cream of its people to do the most important task — teaching elementary school."

Old Knowledge

Dr. Brenner complained that many of the teachers gained their knowledge 25 years ago; yet they pass on the same knowledge to pupils who will use it 25 years later.

He sees a trend toward recognition of that educational paradox. Dr. Brenner describes the Peace Corps as a "kind of social service with young people going out to teach older people."

As Warren lecturer, he spoke Oct. 28 on "The Future of Molecular Biology" and the following day on his own special area of interest, "Nonsense Mutants and Their Suppression." Since 1957, he has been a member of the scientific staff of the Medical Research Council Laboratory of Molecular Biology at Cambridge, England.

Doctors Give Blood

A new MGH — Red Cross blood donor program has gotten off to a surprising start.

About 200 of the approximately 1,000 physicians here have already signed to donate their blood. Close to 100 of them have given it thus far.

"Physicians on the staff have been extremely cooperative," said Dr. Morten Grove-Rasmussen, director of the hospital's blood bank. "When you look at a busy hospital population and see that many physicians already signed up and are willing to come when we call them, it is gratifying."

Dr. Allan Kliman, director of the Red Cross blood program for Massachusetts, called the response tremendous. He said that a two-day drive among a group of 2,000 Massachusetts physicians once netted only five donors.

The hospital and Massachusetts Red Cross launched the program right after Labor Day. With a critical blood shortage periodically plaguing the state over the past few years, the project was seen as a possible solution.

About 10 business organizations and other groups like labor unions have joined the effort. Business and private organizations can take part by providing blood donor groups to the hospital's blood bank.

Continued on Page 7

Dr. John H. Knowles, general director, one of about 200 MGH physicians who have signed up to donate blood. Nurse is Mary Rota, R.N.

If 25 per cent of a group of 100 or more members donate blood each year, all the members and their immediate families become eligible for the "insurance" of unlimited free blood during that year. Blood ordinarily costs $25 a pint.

To expedite the program within the hospital, Dr. Grove-Rasmussen sent cards printed with the names of doctors to each staff member. A similar technique will soon be applied to the nursing staff, and later to all other employees.

1932 Mystery

Continued from Page 3

search went all the way back to 1932 and the mysterious illness of the 8-year-old boy who was their uncle.

On the basis of his case history and his relation to the Quincy sisters, physicians are almost sure the uncle suffered from the same disease.

Like many similar disorders, homocystinuria is inherited as a recessive trait. This means that for a child to be born with the disease both parents have to carry the genetic unit (gene) that causes it. The odds are one in four that any child born of such parents would inherit homocystinuria.

If the disease is discovered early enough, doctors believe that they can at least prevent the child from developing severe symptoms.

Children are placed on a special diet low in methionine. Homocystine, the other amino acid they are unable to break down, is a derivative of methionine and is not found in food.

Held to Low Level

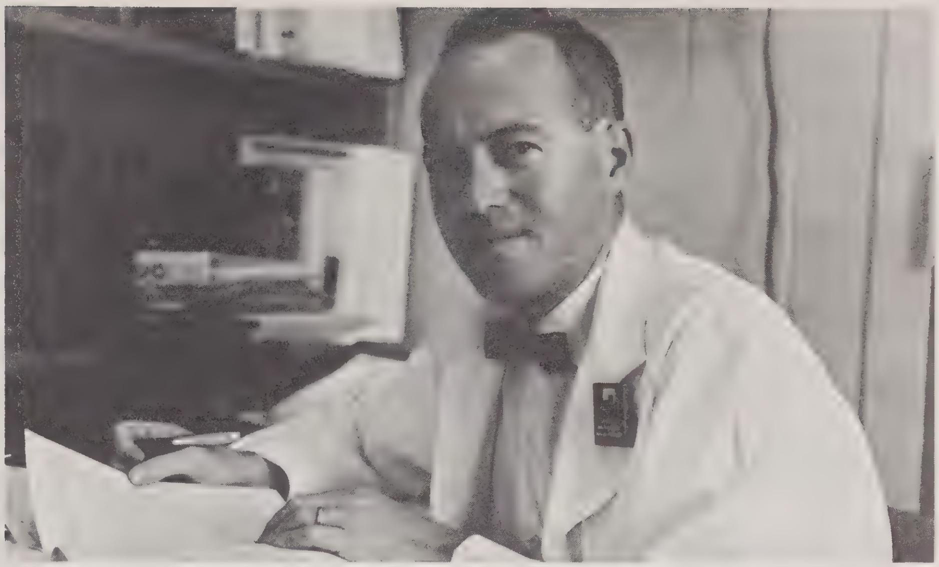
Thus, by eliminating food high in methionine, homocystine is also held to a low level.

In the case of the Quincy sisters, however, their condition was turned up too late for the diet to benefit them. Other treatment is being sought for them.

Within the past 18 months, two other cases have been picked up through a Massachusetts state screening program of newborns. The infants have been placed on the special diets.

"It is too early to tell whether the diet is effective," Dr. Vivian Shih said, "but so far, results are promising."

The two children are the youngest Americans ever detected with the disease.



DR. KURT J. ISSELBACHER

How Our Diet May Alter Blood Cholesterol

Continued from Page 8

"Studies in collaboration with Dr. Robert K. Ockner (now of the University of California Medical School, San Francisco) have provided a possible explanation for this effect."

Studies Concern Cholesterol

The studies concern cholesterol, a primary animal fat that is one of the substances that clog the arteries in arteriosclerosis. Cholesterol gets absorbed and carried into the lymph, a system involving the absorption of fats and their transfer into the bloodstream.

Until those studies, it had been generally thought that just one type of fat-transporting protein (lipoprotein) was associated with absorbing and carrying cholesterol into the lymph. The new work demonstrates that two types are involved. One is large particles called chylomicrons; the other is small particles which are very low density lipoproteins.

"It has been shown," Dr. Isselbacher said, "that in the fasting state and when saturated fats are given, most of the cholesterol is carried in the very low density lipoprotein fraction. However, when unsaturated fats (and especially polyunsaturated fats) are given, there is a pronounced shift of cholesterol to the chylomicron fraction.

"This change in distribution of cholesterol in chylomicrons and very low density lipoprotein is important. When cholesterol is carried in the very low density lipoprotein, it is removed slowly from the bloodstream. However, when cholesterol is carried in the chylomicrons, these large particles are very rapidly removed by the liver and the cholesterol is metabolized (broken down) there to bile salts and excreted in the bile.

"In other words, when unsaturated fats are given, the cholesterol which is absorbed is removed much more quickly. This seems related to its transport predominantly in chylomicrons rather than very low density lipoproteins.

"This observation, which has been confirmed by workers at the Australian National University, may be of significance in human cholesterol metabolism and contribute to the efforts aimed at modifying the development of arteriosclerosis."

Outstanding Contributions

Dr. Isselbacher also described past research conducted at the MGH. Major contributions to medical understanding of the manner in which dietary fats are absorbed in the body resulted from that research.

Dr. Isselbacher received the Bengt-Ihre Award for "outstanding contributions in the field of gastroenterology." A native of Wirges, Germany, he joined Harvard Medical School in 1956 and the MGH the following year. He is a cum laude graduate of the medical school and is a former president of the American Association for the Study of Liver Diseases.

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They've Been Visiting for a Hundred Years

"To companion another's loneliness, to ease a troubled mind, to use one's health and time for another's illness. . . ." So reads the motto of the Ladies' Visiting Committee of the MGH, which this year is celebrating its 100th anniversary.

The committee started on a small scale in 1869 when the trustees appointed a group to investigate the possibility of having female visitors to the female wards. The report of the group is, in retrospect, amusing: "We are able to think of no objection to the plan except that the hospital is very well managed as it is and that it seems unwise to disturb what is satisfactory."

However, the report concedes that "although the hospital is about as well managed as men can manage it," it might benefit from the presence of "judicious women." So the Ladies' Visiting Committee (LVC) was set up with an injunction to exercise "care in the selection of individuals."

Care was exercised, and results were good. Within a year, the committee's province was extended to all wards, and it was well on its way to its present broad role. Today, under the chairmanship of Mrs. Nelson Aldrich, the voluntary LVC still elects its members with care. But now the committee mans the General Store, the Travelling Store, and, with the MGH Service League, the Coffee Shop. It provides beverages for incoming patients and their families through the Baker Hospitality Service, and it is responsible for flowers and art works throughout the hospital.

There is a committee which arranges activities for house officers' wives, a committee which supervises the maintenance of the chapel, and even a Christmas committee. Operating expenses come from the stores and from endowments, and all profits are used for the benefit of the hospital. The LVC prides itself on supporting pioneer projects which have the general director's approval, and in that way they have given initial boosts to Social Service, Occupational Therapy, and the Volunteer Department.

However, the major purpose of the Ladies' Visiting Committee remains: to visit. They visit patients who are far from home or who have no family or friends visiting them. They visit children who need friendship and entertainment. They visit long-term patients.

Although due to the size of the hospital the committee can no longer wander through the wards visiting one and all, they now obtain referrals from the hospital staff, the members on the Travelling Store, and anyone else who may know of a need. Mrs. George L. Blackman, chairman of the Ward Visiting Committee, receives messages at the Volunteer Department office from anyone, ranging from hospital staff to alert and sensitive visitors, who might notice a patient who would appreciate companionship.

Mrs. Nelson W. Aldrich, chairman of the Ladies' Visiting Committee, visits with Shirley Roberts in Burnham.

Dr. Kurt Isselbacher Reports Diet–Blood Cholesterol Study

Studies showing how diet can alter a process involved in hardening of the arteries have been described by an MGH researcher.

Dr. Kurt J. Isselbacher reported the findings in Stockholm, Sweden. The chief of the MGH Gastrointestinal Unit was in Stockholm to receive the Swedish Medical Society's "Bengt-Ihre Award." The Harvard Medical School professor of medicine told the society:

"For some time, it has been known that the ingestion of unsaturated fats lowers blood cholesterol. However, the mechanism of this action has remained obscure.

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MGH News

Vol. 28 No. 2 Massachusetts General Hospital, Boston, Massachusetts February, 1969

Mothers Can Help Make Organ Transplants Safer

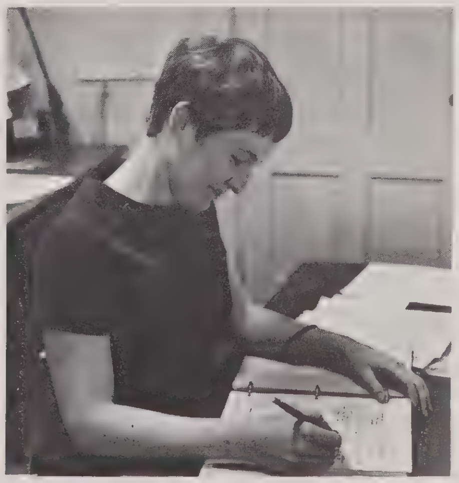
An MGH group is appealing to mothers to donate blood to help make organ transplants safer.

"People can fill an important need," Henry Winn, Ph.D., said, "just by contributing a small amount of blood — less than the normal blood donor gives."

The samples will be used to improve a special test, employed at the MGH and other centers in the world to predict whether a given person will prove a good donor for the patient needing a transplant.

The MGH does all the testing (called tissue typing) for the Interhospital Organ Bank. (Located in Boston, that organization acts as a regional clearing house for obtaining, preserving, and distributing tissues for transplantation).

Tissue typing works for matching of any type of organ transplant. Most of the experience, however, has been with kidneys.



Dr. V. Anne Wonham filling out a tissue-typing report in an organ transplant case.

The MGH started transplanting kidneys in February of 1963. Since then, the hospital has transplanted about 55 of them.

"The progress in tissue typing has been tremendous," Dr. Winn, Director of the Histocompatibility Laboratory, said.

Surgeons generally will not transplant an organ which is considered to be mismatched.

But where human life is concerned, the aim is perfection. To date, the test falls far short of that ideal.

With identical twins, testing is unnecessary. Identical twins come from the same egg and thus inherit the same physical makeup.

Non-identical sisters and brothers have one chance in four of similar composition. The more people differ in makeup, though, the greater the risk in transplanting an organ from one to the other. Under these conditions, the body is likely to reject a transplanted organ as being "foreign."

Transplanting kidneys between identical twins results in 88 per cent survival at two years. When a brother or sister is the donor, survival is 76 per cent at two years. The rate falls to 38 per cent at two years when a cadaver kidney is used.

"We could probably bring the survival rate up to about 90 per cent if we could select appropriate cadaver kidneys on the basis of improved tissue typing," Dr. Winn said.

This is where the blood donations come in. Dr. Winn and Dr. Paul S. Russell, director of transplants, have been urging women's groups to donate.

Continued on Page 3

Center Is Improving Care in Charlestown

A hum of voices pervades the large room. Occasionally, the cry of an infant and the constantly jangling telephones vie for attention.

A knot of mothers and their small children stand in front of a sign that says, "Registration Desk."

The scene is the MGH — Bunker Hill Health Center at 73 High St., Charlestown. Slowly the program is turning in the direction of its ultimate aim — to become a nationwide model for neighborhood family health centers.

A community that never before had specialists such as internists or pediatricians working in it, Charlestown is beginning to experience the luxury of comprehensive medical care in its most modern form.

The MGH center took its first halting step in September by assuming from the city of Boston the health services of Charlestown's seven public schools. A grant from the Children's Bureau of the Department of Health, Education and Welfare made that beginning possible.

On Jan. 1, the center added the three parochial schools. Now the red-brick building serves a total of 4,500 children.

Jan. 1 also saw the center take over the personal health care services previously carried out in Charlestown by the Boston Department of Health and Hospitals.

Continued on Page 4

MGH *News*

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EDITORIALS:

Just a Little Blood Can Go a Long Way

Tissue-typing, described in a page one article of the *MGH News,* is becoming a valuable tool for transplant surgeons.

This hospital plays a role that is especially important since the MGH does the typing for all Boston hospitals. As the expertise in matching potential donor and recipient grows, the chance for transplant success improves.

To better its matching expertise, the hospital is now seeking blood samples from women who have had three or more children. The amount of blood needed from each woman is small. The potential benefit to mankind is great.

Grandmother Sets Example For Doctors

Dr. Mary Calderone, the grandmotherly representative of SEICUS (Sex Education and Information Council of the United States), famed for her straightforward sex lectures, uses both means and messages which should carry over into areas of life other than sex education. She meets teen-agers' questions head-on, explaining that she wants to hear ". . . aloud questions. I mean A-L-O-U-D, of course. Any question is allowed, permitted." In answer to a question from a 10th grader concerning homosexual advances, she says, "You're going to be able to say 'Cool it, this is not for me.' But you owe that person your responsibility and understanding, even if you don't share his convictions."

Whether out of a sense of owing or out of generosity, she follows her own advice, showing respect and understanding to the groups to whom she lectures. High school students respond to her: they talk to her openly and eagerly, forgetting the squirms and giggles they find necessary when asking questions of other adults. They believe in her and in what she has to say, because she believes in them. She has faith that youngsters will talk maturely about their problems if they are given the chance by a willing, interested adult. She is seldom disappointed.

Not only Dr. Calderone's message but also her approach — taking the initiative to get out and talk to groups — need to be emulated by other doctors across the country. The sexual revolution may be a myth, as many contend, but sexual problems are not. These and many other topics of interest to both teen-agers and adults should be discussed openly. People, especially young ones, need to hear it straight, in mature confrontations, from those who know; and doctors often know more than most.

Arthritis Exercises Tricky to Prescribe

Exercises designed to maintain the essential strength of thigh muscles in arthritis can have grave consequences if not properly administered, Dr. Thomas L. DeLorme has warned.

The Assistant Orthopedic Surgeon at the MGH said that the exercises are used in several forms of arthritis affecting the knee. He told the annual meeting of the American Academy of Orthopedic Surgeons in New York that properly-administered exercises frequently result in improvement of symptoms and in gains in the use of the arthritic knee.

"But it must be remembered," he warned, "that the ill effects of poor exercise, like drugs, should be given with full knowledge of the body's response to them and of indications."

Each form of arthritis has a different cause, disease pattern and set of symptoms, Dr. DeLorme said, "and each requires its own specific exercise regime."

He emphasized that the symptoms of a particular arthritic joint greatly influence the characteristics of the exercise chosen to produce the desired results.

The presence of pain, swelling, fluid and stiffness, he said, may not make inadvisable even strenuous exercise, "but these conditions would definitely complicate the problem."

Dr. DeLorme is Clinical Associate in Orthopedic Surgery at Harvard Medical School.

HIGH AND DRY

It takes both practice and excellent vision
To look at peripheral smears with precision,
So don't look for subtle disease
microscopically
'Til you're sure that your talents are optimum
optically.

MICHAEL M. STEWART, M.D.

The *MGH News* welcomes letters from its readers. To avoid condensation, letters should be brief. They must be signed and should contain the writer's title or department at the MGH and home address. Names will be withheld on request.

Mothers Can Help Make Transplants Safer

(Continued from Page 1)

What they seek are donors who have had three or more children. When a woman is pregnant, she may become sensitized to foreign factors (antigens) from her husband which are carried by her unborn child. This sensitization of the mother causes her to produce special antibodies, and the more pregnancies she has, the more chance there is of this occurring.

Fortunately, these antibodies, which are used in the tests, harm neither the mother nor her children.

Screening Women

"We're shooting at screening as many women with three or more pregnancies as possible," Dr. Winn said. "We will pack up our group to go out and take blood among requesting organizations. Individuals can telephone 726-3708 for an appointment or come to Room 41 in the White Building."

V. Anne Wonham, Ph.D., a Research Fellow in Surgery, pointed out that the first sample taken is very small. Back in the tissue-typing laboratory, the researchers go through a long process of determining whether any of the samples contain any strong antibodies.

The laboratory discards the majority of samples because they lack the strong antibodies sought. The physicians then return to those women whose samples are desirable.

"We ask them for about half a pint," Dr. Wonham said. "That's less than the normal blood donor gives."

The woman should never have to donate her blood again for this test.

Freeze Blood

"We can save the blood for years by freezing it at −70 degrees Centigrade," Dr. Winn said, "and only minute amounts are used for each test."

"We score all the antibodies," Dr. Wonham said, "to see what percentage of the population they would react with."

It is the serum portion of the blood that contains the sought-after antibodies.

"Each woman is potentially capable of making a unique serum," Dr. Winn said. "There could be billions of combinations made from just 25 different antigens."

Before a given serum can be used for crossmatching transplant recipient and donor, the physicians must know everything they can about it. They compare the serum of each one against that of each other person. Because of the large number of reactions, the process could take more than a year.

Uses Computer

Dr. Wonham, however, programs the information to a computer. With the system established, she can program the computer in one week and get the answers back the next.

To date, there are many questions that remain unresolved.

"We don't know yet," Dr. Winn said, "if it makes a difference which of the factors are mismatched. The standard is changing. But some rules are being laid down.

". . . Yet this test is not experimental. We know these things work."

To learn more about the importance of individual factors or antigens in cross-matching donor and recipient, more of the common factors are being sought.

Six Different Groups

The hospital now has about six different clearly defined groups of antigens. Picking up other groups by sampling more women would add to the information pool used in cross-matching. Having more samples of each group also helps by providing a double check against possible error.

"Every new serum we get," Dr. Wonham said, "makes it that much better." Dr. Winn works closely with Dr. Bernard Amos of Duke University who devised the test, and with other investigators throughout the world. Many of the sera used at MGH have come from Dr. Amos, and programs are being initiated to facilitate world-wide exchange of sera.

Several other laboratories across the country are developing their own tissue-typing centers using the same test.

"We could set up a common bank of sera to improve the test," Dr. Winn said.

Studying Mismatches

The various centers could strive to determine what type and degree of mismatch leads to a rejection.

Such investigation could in turn lead to refining the present rules of matching.

"We think we even will reach the stage when we can say definitely that a given donor won't cause rejection with a given recipient."

As director of the program, Dr. Russell is optimistic about what transplants can accomplish:

"We are dealing with young people who are sick with just one disease. If we can help them with transplants, we have the possibility of giving them normal life."

Dr. V. Anne Wonham and Dr. Henry Winn studying tissue-typing chart.

Center Is Changing Charlestown Health Care

(Continued from Page 1)

It opened its doors to all ages and income groups at that time, bringing the entire family into the health picture.

The Boston Department of Health and Hospitals is continuing to provide the center with major support. In fact, Dr. Jonathan Fine, Deputy Commissioner for Community Health, is already evaluating the program with an idea of later bringing Charlestown-type services to the rest of the city to improve the general health of Boston.

What Drs. Fine and Paul M. Densen, Director of the Harvard Center for Community Health and Medical Care, are studying is a change in approach. Until last fall, Charlestown was like any one of hundreds of American communities gripped by a medical manpower shortage. The shortage translated itself to inadequate and fragmented care.

In a spot check last May of 205 Charlestown children pre-registered for kindergarten and the first grade:

- Only 68 per cent had the basic immunization series against diphtheria, whooping cough and tetanus.
- Only 42 per cent had a booster.
- Only 61 per cent were fully immunized against polio.
- Only 41 per cent had measles shots.

"We now have both the availability and accessibility of care which can change statistics like these," said Dr. John P. Connelly, Executive Director of the center.

Few of the changes being made in Charlestown are strikingly new. For the first time, however, the services are being provided in a coordinated way.

"In school health," Dr. Connelly said, "we are providing a central service for all facets of care instead of the isolated and fragmented manner of yesterday. In one sitting, we test hearing, vision, blood, urine, blood pressure, and vital signs, take growth measurements, get a complete medical history and give a physical examination. When needed, we are backed up by the specialty care available at the MGH.

Comprehensive Overview

"Thus we provide a comprehensive overview of the health of the children."

One example of a new service is the throat culture. The state has offered throat-culturing facilities for many years. Until the establishment of MGH — Bunker Hill Health Center, however, there was no system designed to reach the Charlestown patients at highest risk — the children.

Now throat cultures are becoming a routine part of the center's school health program. They are sent to state laboratories for examination. If positive, calls are made to the center which then arranges for appropriate treatment and follow-up.

Dr. John P. Connelly, Executive Director of MGH, Bunker Hill Health Center, examining Charles Ryan, a first grader at St. Mary's School, Charlestown.

"We are uncovering a lot of strep infections in the throat," Dr. Connelly said. By treating the strep throats, the center can prevent rheumatic fever and the serious kidney ailment, nephritis.

Under Dr. Edward C. Dyer, Chief of Pediatric Services, the physicians are providing a human touch to the school children's examinations.

Doctors Really Care

"These doctors really care," one mother said. Their thoroughness is turning up conditions that went undetected before.

The care also extends to mental health. Alvin Simmons, Ph.D., Chief of the center's Community Mental Health Services, works closely with school and court authorities and with other social service agencies, and with the parents on school adjustment problems and parent-child difficulties.

In one elementary school, for example, Dr. Connelly turned up a youngster with an obvious psychological problem. He called in Dr. Simmons.

"The child was shy, withdrawn and frightened," Dr. Simmons recalls. "He came from a broken home and was physically abused."

In reviewing the boy's history, Dr. Simmons noted that a variety of agencies were involved. Since none worked closely together, the help the boy received was minor and discontinuous.

Temporary Court Order

At Dr. Simmons' suggestion, the school guidance counselor called a meeting of the seven agencies including the Health Center involved in the boy's care.

As a result of the meeting, a temporary court order has placed the boy in a foster home until September. This action that the boy's own relatives had tried unsuccessfully to get for four years came less than three weeks after the Health Center's involvement.

"All of us felt," Dr. Simmons said, "the longer the child stayed home, the more damage was being done. We also made arrangements for the mother to be seen and followed so that the change would prove less stressful to her."

From all preliminary evidence, the boy appears to be benefiting from the climate of his foster home.

Under Dr. Roger H. Sweet, Chief of Internal Medicine Services, the same type of comprehensive medical care is beginning to be offered to Charlestown adults.

The MGH center, for example, has taken over the diabetes and tuberculosis programs and public health nursing services.

60 Patient Visits

Since Jan. 1, the center is averaging 60 patient visits per day. Specialty consultations such as obstetrics, surgery, ear, nose and throat, eye, allergy and neurology are being provided at the center.

X rays are one of the new services being offered in February. Routine blood and chemistry and laboratory services are already available.

"Residents who had been forced to seek out care in the crowded emergency rooms and clinics of inner city hospitals," Dr. Connelly said, "have registered their satisfaction at the immediate availability and closeness of a source of competent care."

Waiting for examinations.

1st Grade Registration
First grade registration.

Lack of either close care or means of getting to it had been proving an important handicap. One middle-aged father of four had failed to have a tuberculosis clinic visit in two years despite a long history of the disease. His reason: he could not afford the taxi fare to the South End clinic.

The MGH — Bunker Hill Health Center with the aid of the Public Health Nurses arranged for MGH transportation to the South End. Less than two weeks later, the man was admitted to a hospital for treatment of his deteriorating condition.

High Quality Services

Besides the major collaboration of the Boston Department of Health and Hospitals, the MGH is working closely with several other organizations to provide high quality, personalized health, social and educational services to its patients.

Among the other organizations are the John F. Kennedy Family Service Center, the Little Sisters of the Assumption, the Catholic Charitable Bureau, City of Boston School Department, the Massachusetts Department of Public Welfare and the Massachusetts Department of Public Health.

Two community medical physicians, Dr. Kenneth Quigley and Dr. Joseph Murphy, have joined the staff of the center on a half-time basis.

The next step will be an expansion of health services offered by the center. A major increase in mental health service will be offered in the spring.

Also planned is the establishment of a team consisting of a family health advisor, internist, pediatrician and nurse. Two such teams will be organized to provide multi-specialty medicine. Individual families will become the responsibility of one of the two teams.

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Town Doctors Train in Emergency Ward

Physicians from community hospitals are learning modern techniques at the MGH Emergency Ward.

Instead of the usual lecture-oriented programs, they are getting on-the-job training. A total of 10 physicians already have taken part.

Drs. Stephen E. Goldfinger and Daniel D. Federman reported on the first three participants in the *Journal of the American Medical Association*. Dr. Federman is Associate Physician at the MGH and Assistant Dean of the Faculty of Medicine for Continuing Education at Harvard Medical School. Dr. Goldfinger is Associate in Medicine at the MGH and Director of Community Programs in the Department of Continuing Education of the Faculty of Medicine at Harvard Medical School.

"The program," Dr. Goldfinger said in an interview, "can set an example for other teaching hospitals which have emergency rooms as well staffed as ours. For example, one-fifth of our entire medical House Staff is assigned there.

Effective Classroom

"When such a number of well-trained House Staff, who have an additional desire to teach, are placed in a milieu in which a wide spectrum of trauma (injury) and disease is encountered, a truly effective classroom results."

The first three physicians in the program had retired from their individual practices to form the core of a group of five which would be responsible for the full-time coverage of the emergency ward of a nearby community hospital.

"The physicians," Drs. Goldfinger and Federman wrote in the *JAMA* paper, "desired a course that would provide guidance and experience in modern emergency-ward techniques — and they emphatically stated that they would be happy to learn and work alongside young interns and residents."

Everyone Benefited

"Much of the training has come from the House Staff," Dr. Goldfinger said in the interview. "Both the postgraduate students and the house staff benefited. The interns and residents gained experience as teachers and in working with a group of local medical doctors who could recount a reality all their own."

At the end of a two-week period, the three original participants had encountered a broad spectrum of patient care problems. In addition, they had benefited from two hours of precept instruction with faculty members each afternoon. Each had received a temporary hospital appointment as Graduate Assistant in Medicine.

Though neither Dr. Goldfinger nor Dr. Federman claim a precedent for originality in the devising of the postgraduate program, they agree that such programs are feasible. They plan to expand the learning period to three or four weeks whenever trainee time permits.

"As demands for such training increase," they wrote, "so must our efforts to provide it in a manner both useful and attractive.

"It is possible that the apparent benefit of this program was entirely due to the unique motivation of the students and teachers involved. On the other hand, it is at least equally possible that by providing a milieu whereby direct observation and participation in medical care became the central core of the education experience, the immediate relevance of theoretical to practical aspects of care was underscored."

As a follow-up to the formal two-week program the three physicians are continuing an educational activity under the Director of Medical Education at their own hospital. Additionally, a member of the MGH Staff participates with them in a monthly audit of their emergency-ward care.

"Their hospital has been extremely enthusiastic about their performance," Dr. Goldfinger said. "From what we can tell in our audit, the care they are providing seems to be of a very high level."

The most recent seven physicians undergoing on-the-job training have taken part as individuals. They have had informal discussions rather than seminars.

Whenever Possible

"Whenever possible," Dr. Goldfinger said, "procedural techniques such as tracheal intubation (placing a tube in the windpipe) have been performed by the physician-students under supervision. Many have rotated briefly at the Massachusetts Eye and Ear Infirmary Emergency Ward to observe emergency care they may be called upon to provide in those specialties.

"Emergency wards," he continued, "are experiencing a tremendous increase in visits and diversity of care demanded of them. Most community hospitals don't have full-time coverage.

"As the general practitioners are fading from the scene, emergency ward care is being sought more and more. Full-time emergency room specialists in the future will rotate in groups to provide EW coverage as specialists whose training will provide them with the ability to render effective diagnosis and therapeutic attention during the first 60 minutes of care for true emergencies. By that time the appropriate

Continued on Page 8

In these days (1890) the MGH Emergency Ward was neither as busy nor as complex a place as today.

New Clinic Gives Parents Genetic Counseling

A new MGH clinic is uncovering both rare and common inherited diseases.

The Genetics Clinic opened quietly last August as an arm of the Genetics Unit. Although part of the Children's Service, the clinic treats both adults and children.

"The patients we feel we can help the most," Dr. John W. Littlefield said, "are primarily those in need of genetic counseling." Assistant Professor of Pediatrics at Harvard Medical School, Dr. Littlefield is Associate Pediatrician at the MGH and director of the Genetics Unit. The clinic is under the immediate direction of Dr. Lewis B. Holmes, Instructor in Pediatrics at Harvard Medical School and Assistant in Pediatrics at MGH.

Family Oriented

One of the most family-oriented specialties, genetic counseling involves explaining to parents the degree of risk that a future child will prove defective. In the present state of the art, such counseling generally begins when a couple has already had a defective infant.

Should a couple who have a child with cystic fibrosis, for example, seek advice, the information is as straightforward as mathematics. There is one chance in four that any future offspring will be affected.

Inheritance of other diseases, however, is less clear-cut. Common ailments like allergy and high blood pressure are inherited only to some extent.

Too many other factors are involved, though, to permit the geneticist to give exact mathematical odds in such cases.

"In the future," Dr. Littlefield said, "we hope to be able to counsel more on those disorders, especially since each disease can be broken down into subtypes, some of which can be shown more clearly to be inherited."

An Infant Branch

As one of the infant branches of medicine, genetic counseling holds other drawbacks. One of the sources of diagnostic information is chromosome studies called karyotypes. These studies, done at the MGH by Dr. Leonard Atkins, Associate Pathologist, provide a systematized arrangement of the chromosomes (which contain the factors of inheritance in individuals).

"The question sometimes arises," Dr. Littlefield said, "as to what to do when we find a chromosome that appears abnormal. We are not always sure whether a pattern really is abnormal."

Dr. Littlefield put in the latter category the XYY or "supermale" who has one female and two male chromosomes in each cell instead of the usual one of each for a male.

"It would be desirable to find out how frequent such things are among normal people," Dr. Littlefield said. "From the point of view of the individual, his doctor should be warned of the unusual chromosome, and the information filed away until more knowledge is developed.

"It should be entirely possible to keep this sort of information well locked up just like any other medical record.

Urges Routine Studies

"One can expect up to one per cent of newborns will have an unusual chromosome, and maybe half of these would be of clinical significance."

At present, chromosome studies are done only in cases in which inherited disorders are suspected. Dr. Littlefield would like to see studies become routine. One of the present prohibiting factors is the cost, but presumably research and more common use will lower the expense.

The Genetics Clinic, which meets Friday afternoons, sees patients referred from other clinics or from physicians on the wards.

"Careful attention to other members of the family as well as the patient has already picked up several rare diseases," Dr. Littlefield said.

One example is hypophosphatasia, a rare bone disease turned up in a sister and uncle of a patient.

Rare Ailment

In another case, Dr. Vincent Riccardi, a Clinical and Research Fellow, is evaluating two children who seem to be the second and third persons in medical history with a combination of mental retardation, absence of kneecaps, and urinary tract malformations.

Several cases of chronic pancreatitis, an inflammation of the pancreas, have also turned up in one family.

A new method is making it increasingly possible to diagnose inherited disorders even before a child is born. Called amniocentesis, it involves removing fluid from a pregnant woman's amniotic sac, which surrounds the unborn infant.

The fluid contains cells which are revealing more and more secrets about the child's future.

"We are very much interested in amniocentesis," Dr. Littlefield said. "In collaboration with Dr. John W. Grover and other obstetricians, we are ready to provide diagnostic amniocentesis in selected situations where one might be able to make a useful and clearcut prenatal diagnosis. This permits not just an educated guess about a genetic risk but a definite diagnosis."

Dr. John W. Littlefield examining human cells.

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Wright Airplane Pilot "Lucky To Be Alive"

At a time when man has completed a flight around the moon and back with scarcely a hitch, it is difficult for many of us to believe that some can still remember the Wright brothers' first flight at Kitty Hawk in 1903. But an MGH Corporation member not only remembers the beginning days of flight; he was an early participant.

J. Howard Bushway, an MGH Corporation member since 1929 and a trustee from 1935 to 1937, saw his first airplane in 1910 at a Harvard air meet, the earliest in the United States. He made his first flight in 1912 with Ruth Law, America's first woman aviator; and in 1913, he decided to go into commercial flying.

Started Business

Wasting no time, he found a partner, "Captain" Chauncey Redding, and together they started their "Flying for Profit Exhibition Flying Business" in 1914.

They flew with other associates at fairs and carnivals all over New England and in many Southern states, carrying Red Cross banners on every flight. Most of the people for whom they performed had never seen an airplane before, and their 1910 Wright and 1910 Curtiss Pusher planes attracted large crowds wherever they went.

Dropped Parachutist

In the Boston area, they flew at the dedication of M.I.T. in Cambridge, and in 1915, they became the first to drop a parachute jumper over Boston. Their parachutist, Charles Sonier, was dropped over Berkeley and Boylston Streets, drifted over the Public Gardens, the Common, and the State House, and landed on Joy Street in front of the police station.

When the movie "Birth of a Nation" opened in Boston, the two game pilots tied one of the actors into their plane, and "Captain" Redding flew him over Boston, dropping free tickets as they went.

Their 1910 Wright was the first plane licensed in Massachusetts, and Mr. Redding was the first aviator licensed by the state.

Mr. Bushway considers himself lucky to be alive, since all of his associates were killed flying, but he thinks planes today are even more dangerous than his early ones were. And his opinion on the moon flight? "A waste of money," he said, "just a waste of money."

Repairs being made on Bushway-Redding plane, a 1910 Wright, after crash.
At right is Mr. Bushway's 1910 Cadillac, used to tow the plane.

Town Doctors

(Continued from Page 6)

specialist is generally available to provide more specific care. I would look upon this as a national trend."

Dr. Goldfinger said that there are benefits for the physician as well as for the patient. Instead of being on 24-hour call, he is stationed in the Emergency Ward for eight-hour stretches. His free time is therefore really free time. In addition, there are nurses, x-ray facilities, laboratories and other diagnostic and therapeutic equipment which is not available to him in his office or when he is making house calls.

"The emergency room specialist will find he has more exciting problems, but he will also be able to deal with patients with less severe problems once the more acute cases have been cared for," Dr. Goldfinger said.

"Hospitals are going to have to have first-rate EW's if they are going to be able to serve their communities well.

"It is often just such a facility that will save the lives of young people following injury and handle acute rhythm disturbances that may complicate heart attacks. This new specialty should be regarded as important to the community as well as to the physician."

MGH News

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Research Is Providing Sterile Women with Hope

Wanda and her husband longed for a child.

Her identical twin had given birth to five babies. But perhaps because of having had bulbar polio, Wanda was infertile.

Over a period of four years, her physicians tried every available method of treatment, from medication to surgery. Nothing worked.

That was four years ago. Now the Greater Boston woman has two sons and a daughter.

What worked is a treatment being tried at the MGH and several other centers in the United States and in foreign countries. At the MGH, the treatment has given babies to half the 10 women undergoing it.

The method is one of administering ovary-stimulating hormones in precise dosage and sequence. As yet the technique lacks the simplicity, however, to make it generally available.

"We feel this treatment is unlikely to come into wide use," Dr. Janet W. McArthur said, "until it is adapted by streamlining to routine office practice." Dr. McArthur is Associate Physician at the MGH and Associate Clinical Professor of Obstetrics and Gynecology at Harvard Medical School.

One of the problems right now is an insufficient number of patients for the project. Only those women whose sterility results from an inability to ovulate (expel an egg from the ovary) can benefit. Such women account for from five to ten per cent of all sterility among females.

Since there is danger that the treat-

(Continued on Page 3)

Mrs. Jean M. Stuart, technician of Dr. Olive W. Smith, using the Brown extractor to extract the total urinary estrogen hormones.

Modern Demands Uproot MGH Medical Service

Twentieth century demands have forced the hospital's Medical Service out of its tradition-rooted ways.

The change will be symbolized by a physical move from the Bulfinch Building where the service has essentially remained since 1823. Its new home will be the four unfinished floors in the tower of the new building.

Dr. John H. Knowles, General Director, announced the move in his just-released 1968 annual report.

"With the advent of new special legislation in the form of Medicare," he wrote, "coupled with the general change in cultural attitudes about illness, it has become quite clear that our old, open, 20-bed wards are no longer the appropriate place to treat our patients who must now be afforded the privacy and dignity of semi-private and private rooms regardless of social or economic class.

"This is a most important development, and the financing of the move of the Medical Service to the new building will afford us a magnificent opportunity to review the past and present accomplishments of this great department of the Massachusetts General Hospital and the Harvard Medical School."

In another section of his report, Dr. Knowles took a hard look at the future of the MGH and hospitals in general. In a strong plea, he called on individuals to strive unselfishly for the public good.

"These are exciting times," he said, "and never was it more important for each one of us as citizens to participate in the processes of democracy.

"The entire future of the voluntary hospital system of this country depends on the willingness of each one of us to work actively in the public arena so that we may retain and strengthen our precious autonomy while we simultaneously work together with other individuals and institutions to make the whole field of medical care a better one, more accessible for more people, and at least at a contained and reasonable cost.

"As always, and almost to be expected, the MGH family performed in admirable fashion during 1968, and with the last minute completion of the

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EDITORIALS:

Neither Snow, Nor Rain, Nor Heat…

What happens to a large hospital like the MGH when a snowstorm paralyzes an area?

While it is expensive, industry can shut down. But a hospital provides the care which often determines a person's chance for life. To close its doors would endanger lives.

The story of what happened Feb. 9 and 10 at the MGH is packed with the drama of employees who realized their special responsibility and met it. When the wind-whipped snow started piling high on Sunday night, it became obvious that many employees would be unable to get to work on Monday.

Large numbers of those on late shifts put the hospital's needs before their own inclinations and stayed at their jobs, working extra shifts. In some departments there were cases of individuals who labored for 32 hours, plowing parking lots, delivery platform areas and sidewalks, or performing a host of other normal hospital duties.

Scores of employees trudged miles on foot, defying huge drifts, unplowed sidewalks and streets, and the snow and sleet that lashed their faces.

Somehow man smiles all the more in the face of such adversity. Physically exhausted from their long treks, the employees might have been excused if they were a little grumpy. Instead, many seemed more cheerful than usual. Maybe it was the extra sense of purpose that man feels at a time of need. Perhaps it was the common bond of sharing such an experience with one's fellow worker.

Whatever the cause, the effect was there. Some of the magic quality even seemed to rub off on patients. One man hospitalized in Baker Memorial was probably echoing the sentiments of many fellow patients when he observed the smiling faces of harried nurses and said: "After today, I'd better not hear anyone criticize this hospital."

The result of such employee dedication was predictable. Patient areas, kitchens, parking lots, the Emergency Ward, the clinics, laboratories, offices, and various shops — these and countless other parts of the hospital — were kept open. Volunteers often helped save the day. In some cases, only skeleton crews were on hand. But in virtually every department, the institution was able to function with at least something approaching normalcy.

Fortunately, so paralyzing a storm is a rare experience. When one occurs, however, a hospital needs that extra effort which only dedicated workers who are proud of their institutions can provide. Once again this hospital proved it has such a team.

Blood Banking Must: More Sophistication

More sophisticated blood banking is an international must according to the Director of the MGH Blood Bank and Transfusion Service.

Dr. Morten Grove-Rasmussen said in an interview that modern technology must be exploited in every possible way.

"This is because blood shortages are becoming virtually perpetual," he said.

Transfusions are increasing at an annual rate of about 10 per cent nationally.

"The increase in volunteer donations is meeting just a fraction of this 10 per cent," he stated. "The public response to the shortage in January was terrific. Unfortunately, however, people forget. Blood is needed not only in January, but also all year round."

The brunt of the donations are given by less than three per cent of the country's eligible donor population. At the same time he urged more people to participate, he asked for blood banks the world over to improve their methods for using blood.

One method he cited is splitting the blood into its component parts: red cells, platelets, plasma and other blood products. Often a patient needs only one component. If he requires red cells or plasma alone, the other fractions can be saved for another patient.

"In some cases," Dr. Grove-Rasmussen said, "whole blood is not only unnecessary but can prove harmful. Transfusing it to someone with a circulatory problem, for example, merely increases the volume of blood the heart has to pump and increases the difficulty. Such a patient should get only the packed red cells."

Another suggested improvement is freezing the blood.

Ordinarily, whole blood can be stored safely for only 21 days. As a result, unused units of red cells must be discarded after that length of time.

The MGH has been holding wastage to a minimum by freezing blood using the Cytoglomerator technique invented by Dr. Charles E. Huggins, Associate Director of the Blood Bank and Transfusion Service.

"Freezing blood can further improve blood utilization," Dr. Grove-Rasmussen said.

Sterility Research Is Providing New Hope

(Continued from Page 1)

ment will cause over-stimulation of the ovaries and multiple births, the patients are selected and treated with great care.

"We use this treatment only as a last resort," she said. "We reserve it for a hard-core group of patients on whom everything else has failed."

Medicine can thank veterinarians for the pioneering research in this area. Starting about 1950, their efforts with crude pituitary preparations gave sheep and pigs multiple litters each year. Along with larger litters, though, came fewer survivors.

When the number of deaths outweighed the advantage of more births, farmers gave up on the procedure. Then in 1958, a Swedish scientist, Dr. Carl Gemzell revived it. Through autopsies Dr. Gemzell was able to extract a large amount of gonadotropic hormone from human pituitary glands. Gonadotropic hormone consists of two ovary-stimulating principles that play a crucial part in conception.

In the United States, however, the supply of pituitary glands is small compared to that in nations which have compulsory autopsies. Researchers sought a substitute source of the needed hormones.

Hormone Increase

Dr. Piero Donini in Rome took advantage of the 10 to 20-fold increase of ovary-stimulating hormone in the urine of women going through their change of life, or menopause. He collected supplies from convents in Rome and Florence and purified and concentrated the gonadotropins.

In 1962, in Israel, Dr. Bruno Lunenfeld began testing the substance on patients.

When the concentrated hormones became available in the United States, Dr. McArthur and Dr. Anne Pappenheimer Forbes got a supply. (Dr. Forbes is on leave of absence as Associate Physician at the MGH and Assistant Clinical Professor of Medicine at Harvard Medical School).

In 1965, they treated their first patient with the hormones. She was a Puerto Rican woman who failed to respond to other treatment. With the new substance, she became pregnant immediately.

This may have proved beginner's luck. To determine when to use how much hormone, Drs. McArthur and Forbes observed the changes in the cervical mucus. Later, this guide by itself turned out to be insufficient.

Besides the potential danger, the treatment currently suffers from a troublesome fact of physiology.

Differ Enormously

"Women's ovaries," Dr. McArthur said, "differ enormously in sensitivity. Some are very sensitive. Some are resistant. Therefore, it is essential to tailor-make the treatment to the individual patient."

Now Dr. McArthur is getting more reliable findings by measuring the amount of female hormone called estrogen found in the urine of patients.

"This is a delicate gauge of whether they are responding to treatment, and to what extent," said Olive W. Smith, Ph.D. A consultant to the MGH project, Dr. Smith is using a special technique developed by Dr. J. B. Brown in Melbourne, Australia.

Until Dr. Brown came up with a new device, measuring urinary estrogens took four days—too long to prove practical.

Using the Brown machine, a micro counter-current apparatus, reduces the procedure to four hours. Dr. Smith is working to improve the accuracy of the method, drawing on many years of experience in steroid chemistry at the Boston Hospital for Women.

The research Dr. McArthur is conducting at the MGH together with Dr. Arthur Herbst and Dr. Jardena Ovadia has two unusual aspects. One is an insurance method to make certain that the husband's sperm is available to fertilize the wife's egg at the crucial time.

"This is a stressful treatment," Dr. McArthur said. "The strain is so great it may be transmitted to the husband, rendering intercourse impossible at the crucial time."

To overcome this difficulty, the researchers keep a frozen supply of the husband's sperm. Should the need arise, they can defrost these germ cells for artificial insemination.

In the other unusual aspect of the experiments, Dr. McArthur is using a colony of monkeys. The response of the monkeys' ovaries to various programs of hormone treatment can be learned by direct inspection.

Gaining Information

From the animals, the scientists are gaining information they could not get from human experimentation.

But it is the human children who have resulted from the treatment who provide the real reward.

"It is tremendously satisfying to receive these photographs," Dr. McArthur said, holding up pictures of children.

"I'm sure that without this method, they would not have been born."

Dr. Janet W. McArthur, assisted by Grady Milton, a technician, aspirating mucus (withdrawing it by a painless sucking device) from a female bonnet monkey.

Twentieth Century Demands Uproot Medical Service

(Continued om Page 1)

new building and various other issues discussed in the Trustees' Report, it was necessary that we all close ranks tightly and help as always to make the MGH a better place in which to care for the sick."

Dr. Knowles' plea came after a passage in which he examined the political realities of the day:

"At this juncture in the history of our country, a new administration is taking over in Washington. In the last budget of President Johnson, the field of health and scientific affairs did not enjoy its previous incremental increases in budget from the federal government.

Nixon Administration

"It remains to be seen what the Nixon administration will decide (over the long haul), and we are sure to be involved heavily in new problems of health policy for the citizens of this country.

"When one recognizes that greater than 50 percent of our entire operating budget at the MGH now comes from federal sources, one must recognize the importance of central federal policy decisions on the future of this hospital. The key issues in the public mind and therefore our political representatives' minds in Washington are the issues of rising costs, the quality of medical care and the equality of its accessibility for all Americans.

Working Assiduously

"All of us will be working assiduously over the coming years to involve the hospital more deeply in the issues of cost containment, manpower shortages, regional planning, the development of lower cost extended care facilities, and the proper implementation of Medicare and Medicaid programs."

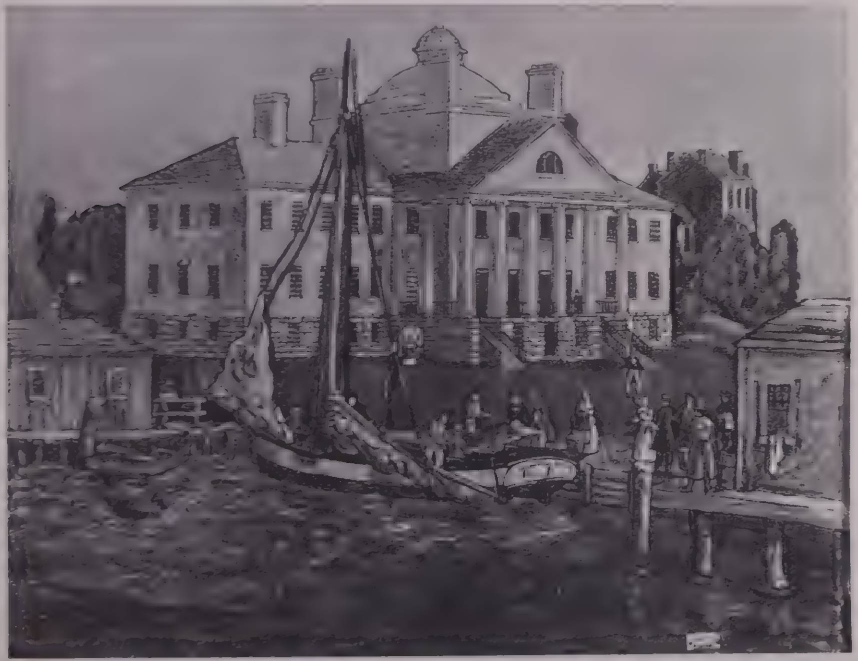
Excerpts from other areas of Dr. Knowles' annual report follow:

"The year has seen us busily engaged on all fronts. Once again we have reached new highs in the volume of our clinical services.

"We have successfully absorbed the problems of implementing the Medicare and Medicaid laws, and we have adapted rapidly to the new responsibilities imposed.

"The Utilization Review Committee has helped measurably to improve the utilization and the quantity and quality of our work.

"The new Committee on Teaching and Education has seized its myriad opportunities and is developing effective studies and programs as we strive to improve and expand our teaching and training functions in the public interest.



The Bulfinch Building, as it was in 1823, when the Medical Service first moved in.

"Manpower shortages are becoming increasingly severe, both locally and nationally, and this hospital must lead the way in the resolution of what has now become a crisis.

"The Committee on Research continues its effective work and has successfully implemented the Trustees' policy designed to ensure the safety and rights of individuals involved in human studies.

"The 'Charlestown Project' with its passionately committed Director, Dr. John P. Connelly, is off to a flying start, and it is clear that we are both needed and wanted by the citizens of Charlestown.

"This is a crucial departure for the MGH, and although there are serious problems to be resolved, I see nothing but good coming from our efforts and our experience as we strive to improve the quality of life for those less fortunate than we.

Similar Extensions

"In the not too distant future, we will see similar extensions to the suburbs where the middle and upper income people live. The need is greatest in impoverished urban areas, but the effective demand for improvement in medical services is coming from the middle and upper socio-economic classes.

"All classes must be served in attempts to improve medical care if viable change is to be effected.

"The new Gray Building with its Jackson Tower and its unfinished shell of nine floors has now been completed after what is essentially seven years of planning and nearly three years of construction.

"The new building symbolizes first and foremost a tremendous vote of confidence in the past, present and future of this institution by our community of patients and friends.

"I believe we have learned several important lessons from the planning and completion of the building. First of all, I believe that we can be entirely confident that the necessary capital will follow good planning.

From Scratch

"Starting essentially from scratch, we have now raised the entire 22-million dollar cost of the building. This is the first time in the history of the hospital that the Trustees have authorized such an expenditure without the capital in hand.

"Secondly, for essentially the first time in the hospital's history, the Trustees have been willing to borrow money if necessary to complete agreed-upon plans.

"Finally, by completing the shell for a future nine additional floors of the new building, we have been able to save tremendous sums of money and have provided for rational centralized future planning.

"Over the coming years, we will fill in each of the unfinished floors with the entire hospital family participating in the planning . . . .

"With capital construction costs rising at the rate of one per cent per month over the last several years, we have already made considerable savings on our new building.

With Confidence

"We now look with increased confidence to the future, and we have already started raising new capital for the next two most pressing needs of the institution and its community — that is for modern radiotherapy facilities and the development of a more balanced Department of Radiology with increased facilities for radiobiology, radiotherapy and radiological research.

"With the retirement or resignation of our various Chiefs of Service, the hospital is given the opportunity to review its departments and to rejuvenate itself with new chiefs.

"At the present time, we have ad hoc committees . . . in Urology, Surgery, Radiology and Anesthesiology. All the incumbents and/or past chiefs of these departments have done outstanding jobs, and the new ad hoc committees have given us an opportunity to review the contributions of these various departments as well as to pinpoint certain imbalances and weaknesses which we hope to correct for the future.

Modern demands force Medical Service to plan move to this new building.

"In addition to the departments named, there are two ad hoc committees at work in the field of psychiatry, one to find a Psychiatrist-in-Chief for the Government Center which will be built close by the MGH and largely staffed by MGH psychiatrists.

"In addition, the McLean Hospital is searching for a new Psychiatrist-in-Chief, which has and will allow considerable review and desirable change in the functions and programs of the McLean Hospital.

Miss Macdonald

"Miss Mary Macdonald was appointed the Director of Nursing by the Trustees during 1968. Following Miss Sleeper and Miss Lepper in this most important department of the hospital would be a difficult job for anyone . . . .

"I think the historians will look with great pleasure on the appointment of Miss Macdonald as she already has won the hearts and minds of, practically speaking, everyone in the MGH family.

"A vigorous, forthright woman of considerable accomplishment, she has instituted new programs and has worked closely with the medical staff to bring about improvements in nursing care, training and education at the graduate level.

Dr. Neumann's Leadership

". . . Under the leadership of Dr. Ellsworth T. Neumann, the various operations of the hospital have performed in admirable fashion.

"The very sinews of this hospital are our various executives in the administration, the department heads, and our nearly 6,000 employees who are all here to improve the care of the patient and to support the critical work of our fine staff of practicing physicians and surgeons.

". . . Finally, let me say that over the past seven years, I have never seen the Trustees work harder than they did during 1968.

"I do not believe there is a finer Board of any hospital in the Western World — one which understands the values and attitudes of the hospital family so well and is so willing to add at a moment's notice to the excellence of the institution . . . ."

Being Young and Single Is Not Always Best

(Continued from Page 8)

the Department of Preventive Medicine at Harvard Medical School, originated the idea of conducting the study, and Dr. Victor W. Sidel, Chief of the Community Medicine Unit at MGH, sparked its implementation.

One main goal was to test the feasibility of such a study. The other was to develop instruments and procedures applicable to research outside a hospital setting. Drs. Sweet and Twaddle told the government in their interim report:

Workable Procedures

"We have developed workable research procedures, identified some major issues and tentatively noted some factors associated with the preventability of hospital admissions. Continued analysis of our data should firm up these baselines and provide rich materials relative to major issues. Such analysis is planned."

Some of the questions left unanswered by the present study are:

Do the findings extend to other areas of the hospital besides the wards? What are the factors that bring people to the MGH rather than other hospitals? What about preventability of illness in a person who gets sick and is treated outside the hospital?

During a six-month contract extension, the investigators plan to:

1. Extend analysis of preventability by preparing for each factor identified a detailed statement of its content, the population at risk and the process by which it arises and is perpetuated.
2. Repeat the analysis reported relative to items associated with preventability and modifiability controlling for age and other factors.
3. Investigate more fully the relationship between preventability failures and diagnosis.

Continuing Study

One area of continuing study may prove to have implications for medical practice. The report to the U.S. Public Health Service notes along that line:

"For example, one of the most interesting problem areas suggested by this research is the matter of definition of health and illness. The patient frequently does not follow the 'doctor's orders,' because he perceives himself as well after a short course of treatment.

"The physician still defines the patient as 'not well' and is sometimes punitive in his approach to the 'noncompliant' patient. The question arises 'To what extent would intensive explanation of the illness and the treatment requirements to the patient reduce the patient's failure to fulfill his part of the treatment?'

"Basically, the patient would be given help in accepting the fact that he is ill and that if a certain course of treatment is not followed, he is in danger of severe complications.

"If it were found that physician education in the issues of lay perceptions of health and illness had a salutary effect in reducing patient failure, this would be a meaningful contribution to medical education."

Two MGH Surgeons Named To Head National Groups

Two national surgical groups have named MGH physicians to head them.

A new group of orthopedic surgeons formed to advance understanding and treatment of arthritis of the hip have elected Dr. William H. Harris chairman; and the American College of Surgeons has named Dr. Claude E. Welch to chair its 1970 Clinical Congress.

Dr. Harris, Associate Orthopedic Surgeon at the MGH and Associate Clinical Professor of Orthopedic Surgery at Harvard Medical School, said that the group he heads was formed at the recent meeting of the American Academy of Orthopaedic Surgeons and was named The Hip Group.

It is made up of orthopedic surgeons from major medical centers across the United States, who, he said, "have banded together to establish a concerted and cooperative attack on the problems of arthritis within the hip joint." The Hip Group will hold its first meeting in May, at the MGH.

Dr. Welch, Visiting Surgeon at the MGH and Clinical Professor of Surgery at Harvard, will be responsible for the format and program of the Clinical Congress, to be held Oct. 12-16, 1970, in Chicago.

Dermatology Pioneer J. C. White Honored

Dr. James Clarke White (1833-1916) was a pioneer who sometimes walked a lonely road.

The founder of the MGH Department of Dermatology stood isolated at times by his original thinking. A man with a bold, creative approach, he has been honored for his pioneer work by being made the subject of the newest volume in a series of biographies called "Leaders in Dermatology."

Dr. White was America's first professor of "diseases of the skin," holding that position at Harvard Medical School.

He graduated from Harvard College in 1853, and received his M.D. degree from the Tremont Medical School in Boston in 1856, following a year as house pupil at the MGH. He spent the next two years in Vienna, gaining an interest in skin diseases there. Although it was almost unknown in America, dermatology was already becoming a specialty in Europe.

Dr. White served as instructor and then as Adjunct Professor of Chemistry at the Harvard Medical School and as Chemist at the MGH until 1871. That year, he accepted an appointment as Physician to Patients with Skin Diseases at the MGH, and was appointed Professor of Dermatology at Harvard. That chair was the first in the specialty in this country.

The doctor's lectures at the medical school were dignified and precise. A student once said that he "demanded and received respectful attention," and that his course was renowned for its difficulty. He failed many, and a talented member of the class of 1902, which had a particularly large number of failures, composed a song for him describing his examinations; part of it went as follows:

> Your exam was on the square,
> At least they said so everywhere,
> Yet it made me tear my hair,
> Skinny White.

The nickname was an affectionate one which came from his specialty rather than his physical size.

In addition to lecturing for 32 years at the medical school, Dr. White played a large part in reforming instruction there, despite the opposition of many colleagues. Changes he initiated included a three-year graded curriculum and thorough examinations in every department of medicine.

A pioneer in many areas, he gave a paper in 1882 discussing the infectious nature of leprosy, and only one member of the American Dermatology Association, to whom he delivered the speech, agreed with him. He followed this first paper up with others urging prevention and control of the disease, and his advice was eventually accepted and applied.

He contributed many articles, reviews, editorials and books to the medical literature, including a very famous book published in 1887 called *Dermatitis Venenata: An Account of the Action of External Irritants Upon the Skin.* It was the first book ever published on the subject.

An active man throughout his career, he was the first president of the American Dermatological Association and again presided over it in its twenty-first year. He was the president of the Sixth International Dermatological Congress, held in New York in 1907, the first of these congresses to be held in America. And he was president for a time of the Massachusetts Medical Society.

A first copy of the White volume was presented recently to Dr. White's grandson, Dr. James Clarke White, an Honorary Surgeon at the MGH and Professor of Surgery, Emeritus, at Harvard Medical School. Participating in the ceremony was Dr. Thomas B. Fitzpatrick, Chairman of the MGH Department of Dermatology.

Brave New Employees Protect MGH at Night

It is when the MGH corridors are void of daytime personnel, when the patients are all asleep and the still is broken only by the arrival of emergency cases, that two of the hospital's most recently-acquired employees arouse themselves to work.

Having slept most of the day on the Thayer roof and devoured 12 cups of meal and a pound of hamburger, Kurt and Axel ready themselves for a night of varied activity.

Maneuvering equally well in total darkness and in light, the two German Shepherds help their Security Department handlers, Richard J. Nash and Francis J. (Jack) Sears, track down unauthorized persons in the parking lots and in buildings locked up for the night. Innate ability combined with thorough training enables the dogs to locate with ease trespassers whom men might not be able to find at all without their help.

So far one of the most tangible results of their presence has been the decrease in parking lot vandalism and in threats to security men and attendants on night duty. George Johnston, Chief of the Security Department, pointed out that as soon as word got around that the hospital was using dogs, fewer reports of vandalism came in from employees who park their cars overnight in the hospital lots.

The dogs, who can be utilized during the day as well, if necessary, were trained at the Nether-Lair Kennels in Wrentham, where they were purchased by the hospital. Continued training is being provided by the Boston Police Department, each dog spending one day a week in Jamaica Plain for that purpose.

The dogs are not vicious, except on command, but the mere sight of them is sometimes frightening to people. Axel weighs 90 pounds, and Kurt, 100, more than some of the hospital nurses.

"When they are not working, they will sit docilely in the presence of their handlers and even allow themselves to be patted," Mr. Johnston said, "but when the leather collar, the working collar, goes on, these dogs mean business." However, they are so well trained that the handlers can stop them in their tracks, even if they have already been commanded to attack. "So far they have not received a command to attack, except in training," Mr. Johnston said, "and I hope we never have to give them one."

Generally, the dogs have adapted very well to living and working in a hospital. They don't seem to mind having numerous people drop by to peek at them through the door leading to their cages, but one thing they apparently don't like is the recurring wail of ambulance sirens. Kurt simply cocks his head and looks perplexed, but Axel invariably chimes in.

A rare daytime sighting of Jack Sears with Kurt (left) and Dick Nash with Axel, in front of the Bulfinch Building.

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Being Young and Single Is Not Always Best

MGH investigators have come up with a preliminary profile of the ward patient most likely to have an admission that could be prevented.

He is a young, single, overweight, Americanized person who smokes heavily, has ambiguous symptoms and has not experienced death in his immediate family.

The preliminary study also indicates that illnesses and hospital admissions are preventable to a surprising extent.

Delay in seeking medical care proved to be the most frequent cause of admissions that the 77 patients studied at the hospital could prevent. Smoking heavily and being overweight were also judged among the most important causes. Admissions believed to have resulted from either of those categories were considered "probably preventable."

Half of Admissions

Together, smoking heavily, being overweight, and delays in seeking care accounted for half of patient-preventable admissions.

Drug abuse and alcohol problems were the two next most important.

"I was struck with the extent to which house admissions here were drug or alcohol related," Andrew C. Twaddle, Ph.D., said. He listed use of unsterilized needles, addiction and inappropriate selection of injection sites as important aspects of drug abuse.

Co-investigators

Dr. Twaddle is a co-investigator with Roger H. Sweet, M.D. They are both of the MGH Community Medicine Unit and Harvard Medical School. They have sent a semi-final report to the Public Health Service which financed the study, conducted in MGH wards.

The majority of ward admissions during the period studied (February, 1968-July, 1968) were judged "preventable" or "probably preventable." Drs. Sweet and Twaddle, however, cautioned that what is "preventable" is not always clearcut, and that all conclusions are tentative.

"We can talk about cirrhosis of the liver being prevented by people not drinking alcoholic beverages," Dr. Twaddle said. "But the question arises to what extent alcoholism itself is preventable.

"That is just one area. What if someone has a symptom which is ambiguous to him, and as a result it takes a while to decide what to do about it? What if it is also ambiguous to the physician, and it takes him a while to decides what to do? These factors led to delay which caused preventable admissions to this hospital."

Symptoms that were not incapacitating and which did not involve changes in feeling states often resulted in patient delays in seeing a physician, and in physician delays in treating the patient or admitting him to a hospital.

The investigators found a pattern in the types of patient most likely to experience delays resulting in preventable illnesses and hospital admissions. In general, relatively isolated people tended to have more preventable hospital admissions.

Young people were more likely than older ones to have preventable illnesses. Married people were less likely to have preventable admissions than single or divorced ones. Among the married, those with large families tended more to have preventable admissions.

Death in Family

Death in the family — especially a recent loss — was likely to make people more health conscious and seek prompt care. Patients with preventable admissions were found more likely to have life-threatening illnesses.

Those born in the United States had higher proportions of preventable admissions than those born in Europe. Preventable admissions were more common among third generation patients.

Dr. David D. Rutstein, Chairman of

(Continued on Page 6)

Roger H. Sweet, M.D., left, and Andrew C. Twaddle, Ph.D.

MGH News

Vol. 28 No. 4 MASSACHUSETTS GENERAL HOSPITAL, BOSTON, MASSACHUSETTS April, 1969

Specialization Trend Sweeps Into Intensive Care

(First of a series)

Medicine's era of specialization has swept into the intensive care unit.

Large teaching hospitals across the country are beginning to create separate units to deal with particular types of problems requiring intensive care.

At the MGH, the trend has already reached epidemic proportions. This hospital now has nine different intensive care units and expects more. They represent varying levels of specialization:

- A Coronary Care Unit (Phillips House 2) accepts heart patients exclusively.
- A Respiratory Care Unit (Phillips House 2) sees only patients with severe, acute breathing problems.
- A Neuromedical and Neurosurgical Unit (White 11) cares for those persons with nervous system disorders.
- A Transplant Unit (White 12) handles patients before and after transplant surgery.
- A new unit on the 12th floor of Warren-Baker devotes itself exclusively to open-heart surgery patients.
- A unit on Burnham's sixth floor cares for critically ill children.
- Somewhat less specialized are general surgical units (White 6 and 7) and a general medical one (non-surgical) on Bulfinch 3.
- A new area on the sixth floor of Baker Memorial specializes in several types of medical problems such as coma from liver disease.

(Continued on Page 2)

Drug Research Aims To Help Children Learn

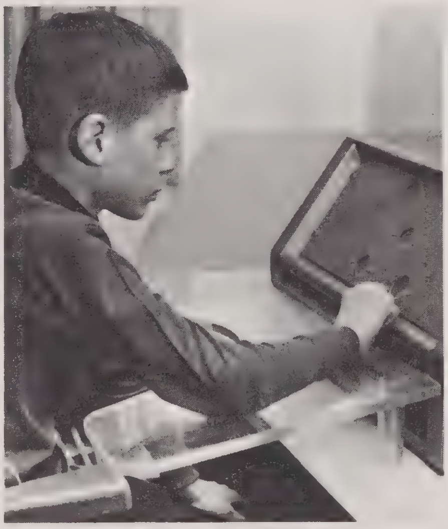
C. Keith Conners, Ph.D., stood beside a large machine equipped with a screen, knobs, and switches, turning and adjusting until the two lines which vacillated along the screen were as closely aligned as possible. "There," he said, "do you see the difference?"

In the next room, visible through a one-way window, sat a child in a large, comfortable chair, watching light flashes and listening to sounds.

The machine Dr. Conners was adjusting was an EEG (electroencephalograph) unit used to measure the brain's electrical impulses. The lines were readings, called cortical evoked responses, from the cortex (outer gray layer) of the brain. A computer attached to the EEG unit averaged out all brain activity which was not related to the child's reaction to the sounds and flashes, so the readings were measures of his specific brain responses to sound and light. Each line represented the activity in one half of the brain, or hemisphere.

"What we're looking for here," Dr. Conners said, "is the difference between the brain hemispheres in amplitude (size) and speed of evoked response. This seems to be related to I.Q. and other cognitive functions."

Investigating such possibly significant relationships is Dr. Conners' job as Project Director of the MGH's Child Development Laboratory. Dr. Conners is also an Associate in Psychiatry at the hospital and an Assistant Professor of Psychology at Harvard.



Billy Dalton, 10, sits at machine for continuous performance test. His task is to push lighted disks when a certain design appears in them.

The laboratory, under the general direction of Dr. Leon Eisenberg, Chief of Psychiatry, is a clinic for the study, evaluation, and treatment of children with learning disorders.

The research, funded by the National Institute of Mental Health's Psychopharmacology Section, is planned to discover factors which play a part in learning disabilities. Participating with Dr. Conners in this effort are a child psychiatrist, Dr. William H. Sack, a research psychologist, a social worker, two psychometrists, two neurological consultants, a secretary, and various students.

(Continued on Page 4)

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EDITORIALS:

Two Views: A Stimulus for Discussion

This issue of the *MGH News* contains a story on Dr. Oliver Cope's views on medical education. Accompanying this story is an interview with Dr. Daniel D. Federman in which he discusses his reactions to Dr. Cope's views. Both of these articles are, inherently, incomplete: Drs. Cope and Federman have been discussing medical education for many years, and brief accounts cannot do these discussions justice; the give and take of conversation is necessarily lost.

Nevertheless, there is value in even a summary. Perhaps the very incompleteness of the form will stimulate readers to express their own thoughts on the subject.

Specialization and the Intensive Care Unit

The intensive care unit is generally regarded as a modern innovation. However, an early version can be traced at least to the 32-bed wards of Florence Nightingale. Off to the side were a few rooms where the patients could be segregated from the barracks-type wards. Sicker patients remained nearer the nursing station and the less ill, farther away.

World War II triggered the triage system of segregating patients according to need and proper place of treatment. The military also pioneered post-surgery units for critical post-operative care.

In the middle 1950's, the U.S. Public Health Service sponsored at Manchester (Connecticut) Memorial Hospital the first progressive care plan in the country. Intensive care was one of the three original parts of this plan. Whether modern intensive care owes its origin to progressive care or to the recovery-room idea is debatable. In any case, the intensive care unit has become an integral part of today's hospital. In fact, the newest trend may make the general intensive care unit pretty much a relic in the larger institutions. The trend is for intensive care to be broken up into various categories.

The result is a concentration of experts and specialized equipment that can only benefit the patient.

In this issue, the *MGH News* introduces a series of articles on specialized ICU's at this hospital. Individually, some of them rank with the best in the world. Collectively, they place this institution in the forefront of a movement that is pushing back still another frontier of medicine.

(Continued from Page 1)

"Among the nine units, there are various levels of intensive care," Dr. Henning Pontoppidan said. The Director of the Respiratory Care Unit, he added, "Some are not quite as intensively staffed or continuously covered as others."

Plans call for improving existing units and, as the need develops, adding others. Like any new service, specialized intensive care sections are sired by demand. Miss Mary E. Macdonald, Director of the Department of Nursing, cited one recent example:

"Open-heart surgery patients occupied every floor of Baker Memorial last June. The problem of delivering adequate nursing care to these patients assumed critical proportions. Out of that crisis, a needed change took place.

"We couldn't take care of all the open-heart patients adequately until we put them together." The result is the new unit on Warren-Baker 12.

What is the advantage of grouping the very sick patients according to the nature of their illness?

"The patient," Dr. Pontoppidan said, "has the benefit of accumulated experience that otherwise is not available. Nurses and doctors who work in these units over the years see literally hundreds or even thousands of patients with a particular kind of problem and become expert in treating them.

"This also means that the patient is under the constant supervision of people who know what to look for to prevent complications from ensuing.

"I would like to emphasize that regardless of the primary categorization of the unit, that is, coronary, neurosurgical, etc., patients who are critically ill have other medical problems as well. To avoid isolation, it is essential that a free flow of consultation and advice is available among the units on an informal basis.

"Fortunately, we have tremendous cooperation among the physicians of the various specialties. Without it, the units would not provide all-round care for the critically ill, and patient care and teaching suffer.

"Another point in favor of the specialized units is that the equipment tends to be used to greater advantage because it is concentrated in one spot. It is right there and immediately available for use by specially-trained personnel. In general units, the nurse often

Specialization Sweeps Into Intensive Care

(Continued from Page 2)

has to be briefed each time a patient arrives with new equipment."

The patient also gets individualized care. This is especially true in the Respiratory Care Unit, unique in its full-time physician staffing.

With its director included, that unit has a full-time physician staff of six. This group also covers consultations throughout the rest of the hospital where they see from 10 to 25 patients with respiratory problems every day. At least one doctor is on duty at all times in the five-bed respiratory unit.

The same individual treatment is available from nurses and technicians.

The resulting high payroll and the expensive equipment make the room rates in several areas more than $100 a day. At the same time, the very ill patient saves the expense of special nurses.

The cost drops dramatically as the patient's condition improves. A surgical patient in the White Building intensive care unit, for example, moves progressively away from there as his condition improves. As the intensity of care falls off in each new section, so does the cost.

The decision about when a patient can leave an intensive care unit is carefully made.

"Every morning," Miss Macdonald said, "the chief resident, the head nurse and the unit coordinator (where there is one) make a collaborative decision as to who should be moved out.

"To plan for the remainder of the day, they even try to predict who will be moving next. Such careful planning is required to make beds available for new patients."

Improved Care

Information gained from experts working in specialized intensive care units often results in improved methods of patient care.

Having such units also aids teaching programs.

"Special units," Dr. Pontoppidan said, "give the physician a chance to observe in a concentrated period of time the most up-to-date aspects of intensive care, to associate with experienced people in the field, and to be under responsible supervision.

"Medical students and younger residents are very closely supervised. Often, in other institutions, the most junior intern is in charge of the sickest patients in the hospital."

Supervised teaching protects the patient. At the same time, the teaching programs train more young specialists who will one day oversee the care of other patients.

Helps Recruiting

The same concentration of the specialist, patients with a common problem, and specialized equipment in one area helps as much in training the nurse and technician as it does the physician.

The specialized units also help the recruiting of nurses.

"Nurses like specialized care very much," Miss Macdonald said. "The closeness of the physician-nurse team is more keenly felt here than in the more diffused units.

"Intensive care nursing is especially attractive to the younger nurses."

On the other hand, working in such units presents problems to the nurse.

"The physical and emotional pressures are so great on the nurse," Miss Macdonald explained. "There is so much responsibility and the emotional ties to the patient are so strong. One patient especially upsetting to the nurse is a child with a malignancy."

Emotional Drains

To help the nurse cope with such emotional drains and pressures, the Department of Psychiatry has assigned a psychiatric staff member to work with the intensive care nurses.

A psychiatric clinical nurse specialist is also available to work with the nursing staff in each building. Prepared by graduate training in psychiatric nursing, these specialists help nurses with difficult management or emotional problems. They work directly with the patients and families and indirectly with the nurses.

Hospitals much smaller than the MGH would find it difficult to provide all the experts required to operate a number of high-caliber specialized intensive care units. But the need is not as great for a small institution.

Dr. Pontoppidan, who is also Assistant Clinical Professor of Anaesthesia at Harvard Medical School, arbitrarily puts the dividing line at 7-800 beds. (MGH has 1,067).

Smaller Hospitals

"When one gets up to 7-800 beds, the number of acutely-ill patients frequently justifies the development of specialized units. The smaller hospitals don't have enough very sick patients with a specific common problem so they can provide better care by concentrating them in one ICU."

Dr. Pontoppidan sees a growing need for specialization in the larger hospitals:

"The trend is for hospitals to be used more and more for surgical patients and the sickest medical patients. The proportion of the acutely ill will continue to grow. As this occurs, there will be an increasing need for facilities to provide intensive care and observation of sick patients."

(Series to be continued)

Eleanor R. Murphy, R.N., Charge Nurse of Respiratory Unit, adjusts equipment.

Child Development Laboratory: Drug Research Aims

(Continued from Page 1)

Children come to the laboratory when their parents or teachers realize that they have serious learning problems. They are accepted for treatment and study if they meet certain criteria: they must have an I.Q. above 80, no severe psychopathology (mental or emotional disturbance) that would require another kind of referral, and an intact family who will cooperate in the study.

Children Given Tests

The children, aged 6 to 12, are then given a large battery of psychological tests, usually about 25. These tests include hearing function, speech discrimination, sound blending, memory, visual perception, motor development, motor coordination, steadiness, rhythm, achievement, intelligence, and electrophysiological tests like the one described above. Testing takes two full days.

Following testing, the children are put on one of two drugs, either a stimulant or a matched placebo (dummy pill). The assignment of drugs is done randomly, in a double blind procedure, so that neither experimenters nor children know whether a child is receiving the drug or the placebo. At present, two drugs are being studied, Dexedrine and Ritalin.

The children are followed for a month on the medication. Parents and teachers are instructed to watch for any changes in behavior and to fill out rating sheets on the children. Tests are readministered, some after two weeks and some after a month.

Dr. Conners and his team of experimenters carefully record and examine any changes or lack of changes to determine whether or not the drug is benefiting the child. They are trying to find out what functions are being altered by the drugs and which children are likely to benefit from such treatment.

Studies are not limited to the laboratory, however. Dr. Conners' group has also worked in private schools for children with language difficulties and with normal children in various other schools.

Improvement In Some Areas

So far, their studies, which have been published in leading psychiatric and educational journals, have shown that Dexedrine (dextroamphetamine sulfate) significantly improves performance in some areas. Attention, rote learning, the ability to bring sounds together into words, and some visual perception all improved under the influence of the drug.

George Strelke, 9, with electrodes taped on for a cortical evoked potential test, sits poised to push lever on chair arm in response to designated sounds.

Also bettered was planning ability, as measured by the Porteus Maze test in which time is not a factor but any error lessens the score. Achievement test scores climbed, and parents and teachers rated the children better in activity level and school behavior (for some reason, these children, most of whom are over-active, seem to be calmed by a stimulant).

Other Areas Unaffected

General intelligence, suppression of muscular movements, discrimination of sounds, and oral reading, however, showed no improvement. Nor did the ability to copy designs or draw a man. Short-term memory and most visual perception were also relatively unaffected.

These results, however, do not contain all the answers that Dr. Conners and his associates are seeking. They want specific information as to how drugs can affect nervous system development and autonomic functions like the activities of glands, and how, in turn, each of these areas affects learning and performance.

They want to understand how the important capacity to blend sounds into whole words is related to reading failure and how the capacity to distinguish a geometric design from a background can modify language ability.

Physiology Plays A Role

Education theories have almost always stressed environmental manipulation as the key to learning, but it is becoming increasingly clear that physiology plays a large role.

What that role is and how to manipulate it is what Dr. Conners and his associates are trying to discover. Taking various tacks, they will continue to investigate, slowly and painstakingly, in these very complex areas.

As Dr. Conners and Gerard H. Rothschild, Research Psychologist for the Child Development Laboratory, mentioned in a recent paper, it has only been in the past few years that

Help Children Learn

Dr. C. Keith Conners adjusts an EEG unit so that lines which represent brain waves come into clear focus.

indications have begun to point to the possibility of enhancing performance in even normal individuals by the administration of drugs.

Precise determination of the effects of certain drugs on learning is still being sought. Yet, they say, there is little doubt that biologists and environmentalists will, in the near future, have a much closer exchange of views, as they begin to discover the effects of environmental factors on the brain and the contribution of the brain's electrochemical events to the learning process.

Miss Anita Magliulo watches as Billy Dalton traces a path through a Porteus Maze.

IN MEMORIAM:
DR. EDWARD L. YOUNG, MGH SURGEON 60 YEARS

"The operation was probably an appendectomy. I don't recall the details, but I do remember that Ed Young, after closing the peritoneum, turned to me and asked me to finish closing the incision. This was my first surgical undertaking!"

These are the words of Edward D. Churchill, M.D., recalling his days as a Harvard Medical School intern at Faulkner Hospital.

"Later, when on call as the 'visit' in the Emergency Ward at the MGH, Ed Young was known as 'generous' in passing down operations to the House Staff. This was at a time when most of the junior visits 'hogged' all the cases they could in order to extend their own experience."

The Ed Young Dr. Churchill refers to was Dr. Edward L. Young, a surgeon on the MGH staff for 60 years.

Dr. Young died Feb. 19 at his home in Brookline, at the age of 83.

A pioneer in pre-paid medical care programs, Dr. Young was a founder of White Cross, a forerunner of Blue Cross-Blue Shield. That activity led him into conflict with the American Medical Association, but conflict did not deter him; and more recently, again against opposition from the AMA, he worked for the passage of Medicare.

A graduate of Harvard College, '06, and Harvard Medical School, '09, he kept his ties there by serving as medical advisor to the Harvard crew.

He did his internship at the MGH and was Chairman of its Social Service Committee. At various times, he was chief of surgery or surgeon-in-chief for New England Baptist, Faulkner, New England Hospital for Women and Children, and Lawrence Memorial in Medford.

He was a diplomate of the American Board of Surgery and the American Board of Urology and a member of the American Urological Society, the New England and Boston Surgical Societies, the AMA, the Massachusetts Medical Society, the American College of Surgeons and Alpha Omega Alpha.

Medical Education: Tradition Holds Us Back

(Continued from Page 8)

a core of basic knowledge before they can begin to be creative. Dr. Cope disagrees with this philosophy.

He believes that by involving the student in his own education from the start, he will learn to educate himself.

"It is much more important to know how to identify what information you need and where to find it than it is to know the information itself," he said. "Too many doctors practice the same kind of medicine, making the same mistakes, 10 to 20 years after graduation that they practiced when they were interns and residents."

By teaching the student to rely on himself for his education, Dr. Cope hopes to eliminate this problem. He suggested two ways to do this: one is to teach solely in seminars, so students would contribute the questions and seek the needed answers rather than merely receive information. The other is to make the student a part of the medical team from his first year in medical school. That exposure, Dr. Cope stated, would have multiple benefits: the student would need to do his own research not only to keep up with the team but also to contribute to it; he would deal with patients as human beings with feelings rather than as objects of scientific interest; and he would learn about the normal and abnormal together, instead of in two separate steps. "What is needed," Dr. Cope said, "is not a change in the curriculum, but a change in the approach to teaching."

Behavioral Science

Another area he is particularly concerned with is the teaching of behavioral science. He believes far too little emphasis is put on the mind and its relation to body function.

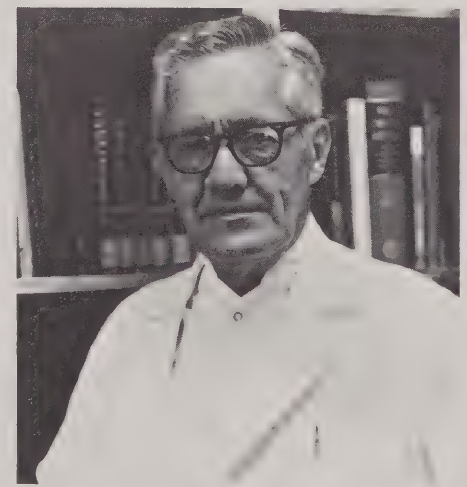
For instance, Graves' disease, which is a disorder associated with enlargement and overactivity of the thyroid gland and protruding eyeballs, marked by psychic disturbance and weight loss, is held by Dr. Cope and others to be a psychosomatic illness which is often better treated by psychotherapy than by physical or chemical methods. He does not believe that adequate coverage is given to the psychological aspect of this and other similar diseases by medical schools. Nor does he think that basic psychology is given enough attention.

Behavioral science, he contends, should be given a much larger place in the medical student's education: "If an enlightened psychologist is available, he should take psychology in college and be given an opportunity to do research with a psychiatrist or psychologist.

Experience Needed

"Too many surgeons, for instance," he said, "are unaware of the patient's fears, including that of an operation and do not look for any emotional problem which could be contributing to the disorder. If young surgeons could have some experience in identifying neuroses and simple emotional problems, the quality of the medical care they could provide would be improved."

Dr. Cope believes that these changes will come eventually, but he is concerned with the way in which doctors view reforms in medical education: "We fail to be critical at the right point," he said. "We are too slow to change in some areas and too quick on the trigger in others."



Dr. Henry K. Beecher has been awarded his third honorary doctorate, this one by the Aristotelian University of Thessalonika, Greece. Dr. Beecher is Chief of Anesthesia at the MGH and Dorr Professor of Research in Anesthesia. He has previously received honorary doctorates from the University of Kansas, from Ireland and from Sweden.

In Reply: Another Look at Medical Education

The following is an interview with Dr. Daniel D. Federman, Chairman of the Hospital Committee on Teaching and Education and Assistant Dean for Continuing Education at Harvard Medical School. He is also an Associate Physician at the MGH.

Dr. Federman, could we begin by having you outline the reforms which the Curriculum Committee at Harvard Medical School have been working on and describe your reactions to these reforms?

The Curriculum Committee have proposed a number of changes designed to accommodate the curriculum to the more varied preparation and aims of today's medical students. They have asked each department to define a core of scientific information that it feels every student should master, and they plan to allow much more flexibility in elective opportunities built around the core. It will also be possible for students to be exempted from portions of the core material in which they've had training.

The first half of the first year is devoted to cell biology in which essential scientific material from biochemistry, physiology, microbiology, and similar disciplines is given to provide the basis for subsequent training in human biology. The course in human biology then runs for a year and introduces the student to the normal and abnormal physiology underlying disease. Thereafter, clinical and elective work will begin. In general, I strongly favor the reforms that have been made and feel optimistic that they will be successful.

Dr. Cope thinks that teaching gross anatomy with a cadaver is archaic and unrealistic. Could you comment on that?

I agree with Dr. Cope that the experience in gross anatomy does not seem to prepare the student to appreciate the functional relationships which are important clinically. In most schools, the time spent on gross anatomy is being reduced.

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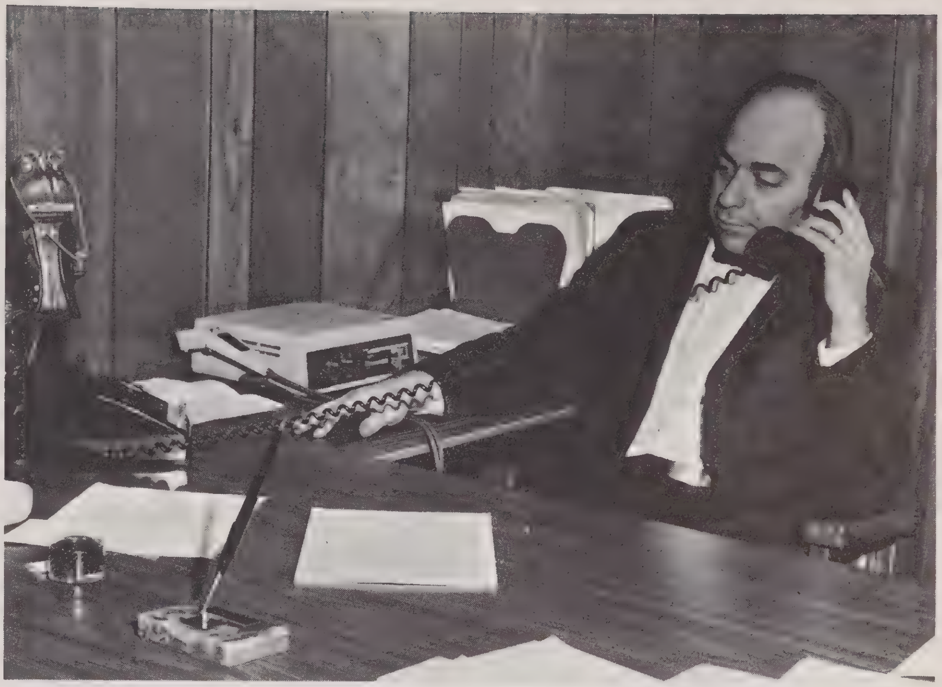

DR. DANIEL D. FEDERMAN

How do you feel about Dr. Cope's views on the role of behavioral science in medicine and medical education?

As one initially and still interested in psychiatry, I have been disappointed at the lack of progress in "explaining" illness with psychological or psychosomatic concepts. I doubt that increasing the amount of time spent on behavioral science will greatly improve the students' understanding of specific medical disorders. I do think, however, that the general training of the practicing physician will be improved by an increased attention to the human environment in which medicine is practiced. If by behavioral science, Dr. Cope means the study of this human environment, then I agree that it is very important.

Would you comment on the proposal that medical schools provide instruction through seminars and clinical experience rather than through lectures?

The best learning requires active participation on the part of the student, and I agree that that should be the goal of much of medical education. However, I do not join in a general condemnation of lectures. I think that a well-conceived and properly delivered lecture is an illuminating and exciting way to teach. If a lecture is critical and informative, it can be an excellent way to introduce a new field, to present some firm data, and to raise some questions which stimulate the student to go further on his own. I believe the lecture has a definite place in the curriculum.

What do you think about shortening the length of time required for an M.D. degree?

Some of the students from accelerated programs have not had the maturity which is usually found in graduates of four-year medical schools. I believe that students should be introduced earlier to a responsible clinical role. I think this will gratify their desire to be physicians and that it will give them an appreciation of the clinical milieu and its scientific demands, which will stimulate their interest in learning more medical science.

I do not share the eagerness of some to release students earlier from medical school, and equally I do not favor increased specialization at the college level, because I fear it would be at the expense of the students' general education.

Do you agree with Dr. Cope that medical schools do not teach doctors to educate themselves?

I agree that medical schools have not stressed sufficiently the responsibility of the student to educate himself, but I think that the number of physicians actively pursuing further education is larger than at any previous time. The increasing solidity and breadth of the scientific base of medicine have generated a new respect for the need for continuing education in many physicians. Publicity in the lay and professional press provides an additional stimulus, and recently the stress on the part of some state medical societies and other professional groups on continuing education has also helped.

How could medical schools increase the number of self-educating physicians?

By pushing the student to think critically about data, by rewarding him for pursuing unclear material to the point where he has straightened out his own thinking, and by training students in presenting material to their peers — that is, by giving them opportunities to teach.

What other changes would you like to see in the curriculum of medical schools?

I would like to see medical students acquire more awareness of the medical and health needs of society. They should be trained to use the technology which is going to be increasingly available and to cooperate with health workers of many other skills so that the limited supply of medical manpower is stretched.

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Medical Education: Tradition Holds Us Back

"The only good thing one can say about teaching anatomy the way we do today is that it's better than grave robbing."

Dr. Oliver Cope, Acting Chief of Surgery at the MGH, made that comment in an interview for this month's *News*.

"Teaching gross anatomy with a cadaver is archaic," he said. "A cadaver is a pickled specimen. It's not like a living person at all. If you wanted to teach a child about a plum, would you show him a prune?"

Dr. Cope has long been interested in medical education. He has served on the Harvard Medical School's Curriculum Committee and on an ad hoc committee on education there, was co-chairman of the Endicott House Conference on Medical Education, and was chairman of the Swampscott Study of Behavioral Science in Medicine. He has authored several books, chapters, and articles on present and proposed methods of teaching medical students.

"What we should do," Dr. Cope said, "is use the post-mortem area for instruction. There, tissues are living tissues like the ones the students will have to deal with. We are ready and able to do that, but tradition holds us back."

Tradition is the bane of Dr. Cope's efforts. The conservative approach he finds in many of his colleagues is frustrating to him because he is full of recommendations for change.

Basic among them is the time required for an M.D. degree. Dr. Cope believes that three years of college and three years of medical school are all that is necessary for the amount of instruction now given in eight years.

"There is an enormous amount of wasted time in medical schools," he said. His proposed plan would move much of the education now offered and required in medical school back into the undergraduate years. Medical schools would then be free to provide instruction in a more "mature and pertinent" manner, one which stresses participation on the part of the student.

The major fault which Dr. Cope sees in the present system of medical education is that "too much is done for the student": he is not guided through his years of learning; he is led by the hand. Professors lecture to him, he takes notes, and he is tested on the material. He is not urged to investigate for himself; he is not asked to contribute. Creativity is stifled.

The philosophy behind the present system is that medical students need

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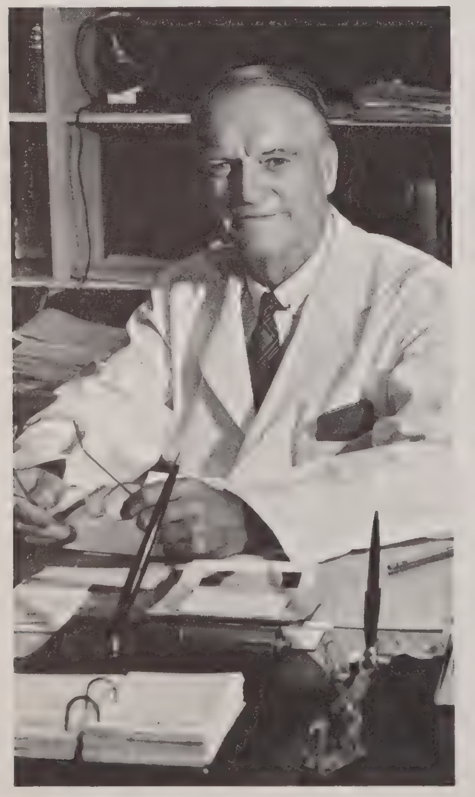

DR. OLIVER COPE

Authored by Dr. Susanne Lamdin, Assistant Anesthetist at the MGH, the following poem is reprinted with permission of the author and Anesthesiology magazine.

"Don't leave me." As if to say:
"Hold me while I'm asleep.
Watch they don't cut too deep.
Watch them."
"THEM"—the mutilators, the deaths in childhood dreams.
"I'll stay with you."
You—the memory of your voice,
your love of living that stood solid, someplace,
behind the fear which made you hold my hand.
The beating of your blood drums in my ears,
my hand pumps in your breath.
My brain serves both our bodies.
Mine sooner has the knowledge of your doom.
My fingers, knowing, hold your lungs expanded
and then let go: a sigh of mourning.
I have to let you wake
so you can make your death your own.

MGH News

Vol. 28 No. 5 MASSACHUSETTS GENERAL HOSPITAL, BOSTON, MASSACHUSETTS May, 1969

Nurses Broaden Role To Ease Pediatric Shortage

Graduate nurses are learning to become pediatric nurse-practitioners at a course sponsored by MGH's Charlestown-Bunker Hill Health Center.

Begun quietly last spring, the program is already training its third class.

Graduates of the course are doing some of the things previously reserved for pediatricians. They use the stethoscope to listen to heartbeats and breath sounds. With the otoscope, they look inside the children's ears.

The course is an outgrowth of the nationwide shortage of physicians. In pediatrics, the lack of specialists is especially severe.

An MGH — Harvard School of Public Health — Harvard Medical School survey concluded last November:

"Action to cope with increased demands for pediatric care cannot await the results of long-term planning or painful readjustments of the educational system."

The course seeks to cope with those increased demands by training the nurse to relieve the pediatrician of a time-consuming part of his case load. At the same time, secretaries and aides can free the nurse of the clerical and other minor burdens she now shoulders.

Two course graduates who are working with a private South Shore pediatrician furnish an example.

Before they took the 16-week course, the nurses did the usual office chores: setting up the room for examinations by the doctor, giving injections ordered by him, weighing the children, etc.

"Now," said Miss Priscilla M. Andrews, Nursing Director of the pro-

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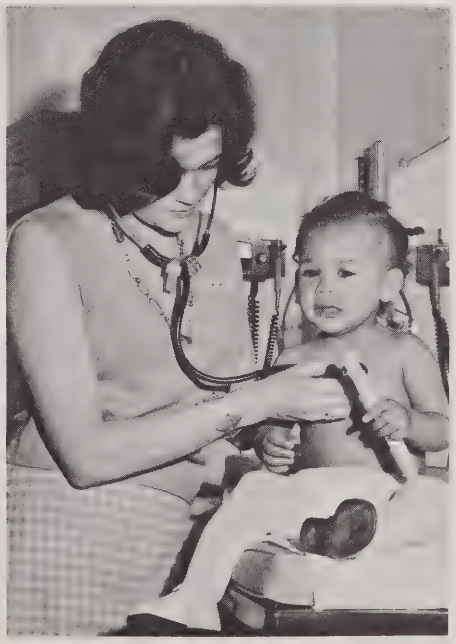

Miss Raenette Nold, R.N., listens to breath sounds of Sonya Teixeira, 1½. Use of stethoscope is one of many things learned in pediatric nurse-practitioner course.

Coronary Care Unit Emphasizes Prevention

(Second of a Series)

It was 3:10 a.m. when a soft but shrill whistle sounded in the Coronary Care Unit.

The three nurses on duty sprang into action. One glanced at the squiggles on a green monitoring screen in front of her.

The irregular pattern measuring the electric impulses from the patient's heart told her that it was probably quivering (fibrillating) ineffectively like a sack of worms instead of beating regularly. A moment later, she was bustling into a room above which a red light had flashed on as the warning whistle sounded.

The tallest of the three nurses was the first to reach the patient, a dark-haired man who appeared to be in his late 40's. He was drifting into unconsciousness.

Making a fist of her right hand, the tall nurse struck him sharply on the chest. Sometimes such a blow will start the heart pumping regularly once more.

"Didn't work," she said. She rushed from the room and picked up a "hot" telephone line. "Code call in the Coronary Care Unit," she said. "Dr. ...."

While the operator began summoning a respiratory (breathing) specialist, the resident in charge of the unit, and the patient's private doctor, one nurse placed a rubber tongue depressor into the patient's mouth to clear the airway.

She applied a mask connected to a black, balloon-type apparatus (an ambu) used to squeeze air into the lungs.

At the same time, another nurse was plugging in a waist-high machine (a defibrillator). She placed two paddles attached to the machine against the man's skin – one on his back and the other on his chest.

On the triggering of a switch, the machine sent out an electric impulse designed to shock the heart out of its quivering. The third nurse had already

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EDITORIALS:

Correcting Electrical Hazards in Hospitals

Since Benjamin Franklin stood outside in a thunderstorm with his kite and key, electricity has been both a boon and a hazard to mankind. The boon has long been recognized in hospitals where modern electrical equipment often saves lives. Belatedly, however, the hazards in hospitals are also being recognized. Some of these are described in an article on page eight of this issue.

What is striking about these hazards is that, because they have only recently been uncovered, they are not regulated by law. But now that knowledge has caught up with reality, the void in the law must be swiftly remedied.

Meanwhile, employees in all hospitals can help make up for such voids by careful individual attention to detail. Such attention is indispensable because faulty equipment can be the cause of fatal accidents. And, as Dr. John Bruner puts it, "Any death due to inattention to proper use of equipment is unnecessary and inexcusable."

Extending a Hand to the Pediatrician

Many approaches have been suggested to solve the nation's shortage of physicians. Not the least of these is the training of nurse-practitioners to relieve the harried physician of some of his burden.

Like many "new" thoughts, the idea of nurse-practitioners is an old one. At the MGH in the 1920's and 1930's, Miss Margaret Reilly, then Dermatology Clinic Head Nurse, was caring independently for patients with skin diseases. She did this with the support of the Chief of Dermatology.

Under Dr. John D. Stoeckle, Chief of the Medical Clinic, a Medical Nurse Clinic began in 1961. Miss Ruth M. Farrisey, R.N., Executive Officer of the Clinics, worked with him in establishing the program. Medical Clinic nurses have since performed as nurse-practitioners.

One of the most crucial shortages is in pediatrics. Therefore, it was only a question of time before some attention would be given to the training of nurse-practitioners to work in that field.

Starting with a small in-hospital pilot program in 1964, the MGH has branched out to hold a regular course that serves the entire Greater Boston medical community. That course is described in a page one article in this issue.

The idea is also catching on at several other medical centers in the country. If early results hold, the pediatric nurse-practitioner should one day become a fixture. And the same is likely to prove true for nurse-practitioners in a variety of other specialties.

(Continued from Page 1)

gram, "their role is much enlarged. The doctor makes the first visit to the hospital nursery to make sure the baby is normal.

"Then the nurse does a follow-up visit to the nursery. She takes a history from the mother and talks to her about any concerns regarding care of the baby at home.

"Once home, the mother calls the nurse rather than the doctor about sleeping problems, colic, feeding, etc. A real relationship is established between nurse and mother. The nurse can give very definitive advice. If necessary, the nurse will visit the baby at home later."

In examinations, besides checking the baby's heart, lungs and ears, she notes how he performs motor functions. From this, she can tell whether he is growing properly.

She learns from the course how to use new tools like the stethoscope and otoscope to make more complete assessments. She learns interviewing and counseling skills and increases her knowledge about growth and development. She gains new information about common childhood diseases and about decision-making concerning them.

How far a nurse-practitioner goes in caring for a child depends on the individual physician she works for. The nurse may be asked to provide most of the contact in simple childhood diseases such as measles.

This increased role requires a decided change in attitude for both the doctor and the nurse.

"Sometimes the pediatrician does not recognize all the psychological problems," Dr. Alfred Yankauer said. Dr. Yankauer is Medical Director of the Pediatric Nurse-Practitioner Program. He is a Senior Research Associate at Harvard School of Public Health, Department of Maternal and Child Health.

(Continued on Page 3)

The *MGH News* welcomes letters from its readers. To avoid condensation, letters should be brief. They must be signed and should contain the writer's title or department at the MGH and home address. Names will be withheld on request.

Nurses Help To Relieve Pediatric Shortage

(Continued from Page 2)

"The pediatrician must give up some of his relationship to parents," Dr. Yankauer continued. "Part of the dependency of the parents is shifted to the nurse.

"If the child has a fever, instead of speaking to the doctor, the mother talks on the telephone to the nurse. . . . The doctor may never need to be consulted. The nurse's total relationship to this family is strengthened, and the family is more likely to consult her first instead of the doctor.

"The nurse has to make a change, too. She takes on more responsibility. For some, this is not always easy to accept."

On the other hand, once physician and nurse adjust to the change, the results appear worthwhile. Miss Andrews said that the new relationship brings doctor and nurse much closer together.

"There is a much closer dialogue," she said. "They talk more about the management of patient care rather than routine clerical things."

More Time for Patients

In fact, a requirement for taking the course is that the nurse will have the opportunity to give up her non-nursing duties when she returns to her job.

With the nurse freed of clerical tasks, she has more time to devote to the patient's problems.

"I feel as though I have been pulled out of a hole in which I have been standing for years," one of the older nurses said. Nursing visits tend to be longer than those the busy pediatrician could give. Hesitant to ask the physician "little" questions, the mothers tend to ask them of the nurses.

"The mothers don't want to waste the doctor's time about the little things," Miss Andrews said. "But they are still worried and need help. Now the nurse has both the time and the training to give it."

Dr. Yankauer believes an added dimension is possible in the nurse-mother relationship.

"Being a woman rather than a man may give the nurse more feeling than the doctor," he said.

Mothers seemed pleased with the results.

"I think it's wonderful," one mother said. "Now the doctor can give my children more attention when they are more seriously ill."

The physicians seem to agree. "They feel the program has freed them," Dr. Yankauer said, "so they can use their time to better advantage."

Fears that the nurse-practitioner might be replacing the pediatrician rather than freeing him have proved unwarranted, Dr. Yankauer said. He also dispelled notions that the nursing shortage might increase as more nurses broaden their own professional duties.

"We are beginning to draw on older nurses who have left the profession," Miss Andrews said. "Also, when nurses find they are using their education and background, they are going to be more satisfied and are not going to leave the profession. This is especially true of nurses with degrees.

Could Increase Supply

"The program, therefore, could help increase the supply of nurses."

MGH's pediatric nurse-practitioner course started with a pilot program in 1964. At that time, Dr. John P. Connelly, then Chief of the Children's Division Ambulatory Service, in concert with the Department of Nursing trained two nurses to assume practitioner tasks on that service.

Dr. Thomas C. Peebles, Assistant Chief of the Children's Service, trained two nurses for similar tasks in his private office.

When Dr. Connelly, who is Co-Medical Director of the Nurse-Practitioner Program, became Executive Director of the MGH-Bunker Hill Health Center, he decided to offer a course for nurse-practitioners. The first course was held in clinics of the MGH last spring in preparation for the move to Charlestown.

Miss Ruth M. Farrisey, Executive Officer of the Clinics, and Thomas Kearney, R.N., Nursing Supervisor of the Clinics, were in charge.

Six Boston Hospitals

Funds from the federal government's Children's Bureau enabled the Bunker Hill center to carry on the program in Charlestown from that point.

Twenty nurses took the first course and 17 the second, which was held in Charlestown last fall. Experience has taught that 15 should be the maximum – the number now enrolled in the third class which will end in June.

Participants for the three classes have come from six different Boston hospitals as well as private pediatric offices and governmental agencies.

Several other medical centers in this country are also beginning to train nurse-practitioners and associates in internal medicine and pediatrics.

In addition, in the field of obstetrics, the idea of a maternity nurse is coming into vogue.

Miss Lois Solari, R.N., head nurse of Children's Clinic, looks into ear of Gilbert Wilding, 5, with otoscope.

Part Two: Coronary Care Lays Stress on Prevention

(Continued from Page 1)

begun rhythmically massaging the heart by pushing on the chest wall with the heel of her hand. One of the nurses also found a moment to ready the medication.

Awakened by the operator, the resident in charge of the unit came bursting into the room, his hair tousled.

Already the sick man's heart was beating regularly. The resident gave him some medication to steady the rhythm and glanced at a large stop-clock on the wall. Only three minutes had passed since the alarm sounded.

Paper Unwinding

Back at the nursing station, the resident twisted a dial. A roll of paper began unwinding.

On that paper were a series of tracings showing the electric activity of the sick man's heart. Played back from a continuously turning tape, the tracings showed the electrical signals beginning a full 60 seconds before the attack and continuing to the very moment the physician was reading the electrocardiogram (EKG).

The patient who suffered the attack recovered and went home three weeks later. The father of six children, he had spent most of his hospital stay recuperating in non-intensive care sections of the hospital.

Doctors and nurses at the Coronary Care Unit on Phillips House 2 remember such incidents well. Fortunately, there have been comparatively few unexpected heart stoppages (arrests) since the unit began 450 patients ago, in November of 1967.

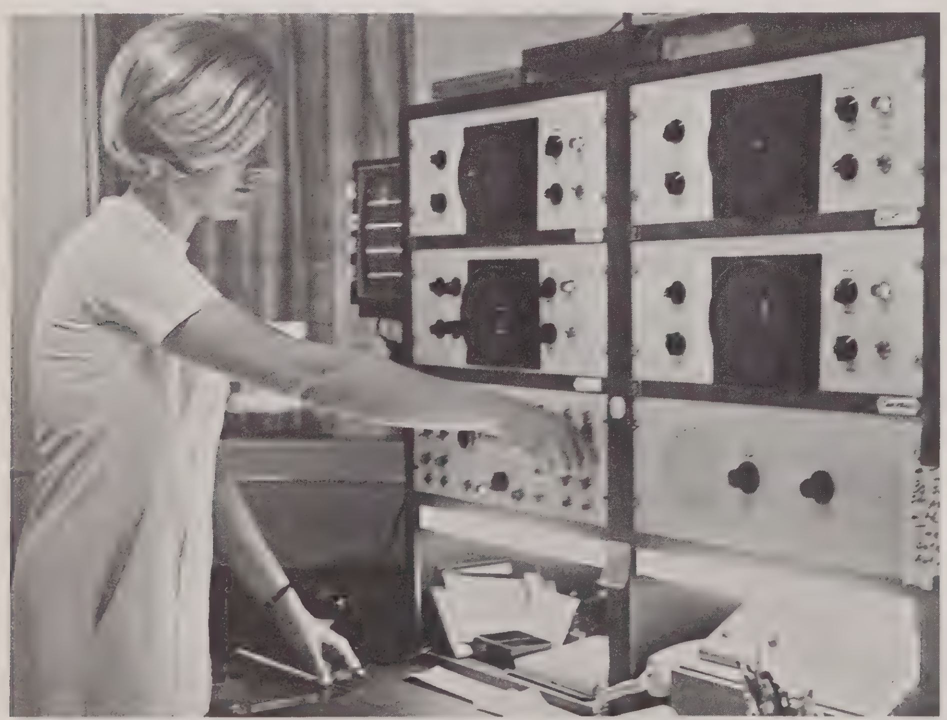
Emphasis on Prevention

"Our emphasis is on prevention of such complications," said Dr. Roman W. DeSanctis, Director of the unit. Dr. DeSanctis is an Assistant in Medicine at the MGH and Assistant Clinical Professor of Medicine at Harvard Medical School.

"We treat such potentially fatal complications when they arise, but our emphasis is on preventing them from occurring," he said.

Patients treated at the Coronary Care Unit have suffered attacks in which a clot of blood clogs the artery supplying blood to an area of the heart. The result is damage to the heart muscle (myocardial infarction, or MI).

While recovering from such heart attacks, patients are susceptible to a variety of irregularities of the heart's beating that are called arrhythmias. These range from the comparatively mild to the life-threatening.



Miss Linda Ross, R.N., can monitor electrical activity in the hearts of all Coronary Care Unit patients by glancing at nursing station screens.

Most arrhythmias (about 85 per cent) occur within three days of the original attack. From 90 to 95 per cent occur during the first week.

One Week in Unit

For that reason, most MI patients remain in the Coronary Care Unit for one week.

Patients who have suffered MI's sometimes go into a state called cardiogenic shock. Like all shock, this is a condition in which blood pressure tumbles, mental confusion results, the pulse rate increases but grows weak, and breathing slows. In the case of cardiogenic shock, the condition comes from the heart's being so badly damaged it can no longer work well as a pump.

A patient in such condition obviously requires truly intensive care.

That is not the case, however, for the vast majority of Coronary Care Unit patients who are not in shock. Although they have had MI's, most feel well. They remain fully conscious and alert.

"For such patients," Dr. DeSanctis said, "it is not intensive care that is needed but intensive watching – watching in particular to prevent life-threatening arrhythmias."

To achieve that goal, a wide variety of technical equipment is on hand. By itself, however, equipment has no purpose.

Nurses Are Key

"The specially trained nurse is the key person in the Coronary Care Unit," Dr. DeSanctis said. "Not only must she be able to treat the patients, resuscitate them and use highly specialized equipment, but she must also know such things as how to give medications used to suppress arrhythmias. She learns to read electrocardiograms, etc.

"By virtue of her special training and by focusing on one aspect, she eventually achieves a proficiency in this area almost equal to that of the doctors.

"She is a super-specialist. The nurse is trained to recognize certain arrhythmias and in certain instances intervene by giving a drug.

"As the unit develops, the nurses will be trained to pay more and more attention to listening to heart sounds and listening to lungs.

"The unit must provide not just medical help, but psychological reassurance as well. Most patients with an MI are very anxious and frequently depressed.

Reassuring Atmosphere

"A tranquil, reassuring atmosphere conveyed by both the personnel and the equipment and design of the unit helps to reassure these patients."

Backing the nurses are the physicians ready to race to the Coronary Care Unit at a moment's notice. Dr. John Kastor works with Dr. DeSanctis as Assistant Director of the unit. Dr. Kastor is an Assistant in Medicine at MGH and an Instructor in Medicine at Harvard Medical School. Medical house officers are assigned to the unit as part of their rotation on the private service. One of them is on call to the unit all the time and sleeps on the floor below to be ready for any emergency.

And each private physician remains in charge of his patient's case.

The fame of the Coronary Care Unit on Phillips House 2 has resulted in a large number of physicians and nurses wishing to work there. Graduate nurses often volunteer to train there.

Mrs. Peggy O'Halloran, R.N., checking monitor in patient's room.

Visitors from other hospitals constantly come to observe.

Bulfinch Unit

A smaller Coronary Care Unit occupies four beds in the 18-bed intensive care section on Bulfinch 3.

"A lot of training and education takes place in the Coronary Care units," Dr. DeSanctis said. "One of the primary missions of the units is to improve the standards of cardiac care in the entire hospital."

As a result of the two units, deaths from MI's throughout the entire hospital have dropped from 30 per cent five years ago to 18 per cent.

"Practically all sudden, unexpected, fatal arrhythmias have been eliminated," Dr. DeSanctis said." Most of the deaths now are the result of serious complications of MI's and shock. Fatalities from cardiogenic shock and other severe complications have been reduced, but are still unacceptably high."

Dr. John D. Minna, a resident, studies tape showing electrical impulses from patient's heart. Playback of tape begins a minute before the attack and continues to the very moment Dr. Minna is reading the tape.

One of Original 5

One of the obvious ways to improve chances for survival is through research. Research in cardiogenic shock is being done in conjunction with a $5-million contract from the National Institutes of Health. The MGH is one of the five original hospitals in the nation to set up Myocardial Infarction Research Units under that program.

Some of the newer principles in management of cardiogenic shock are being applied. In addition, ways are being sought to monitor arrhythmias better.

One trouble with the present system is that it fails to provide a warning for a wide variety of arrhythmias. All those not involving a fast or slow heart rate that triggers an alarm are missed unless the nurse is constantly looking at the monitor EKG.

"The nurses can't look at the screen all the time," Dr. DeSanctis said.

What would prove ideal would be a system that would sound an alarm for all types of arrhythmias. Such a system may become a reality within the next few years.

(Series to be Continued)

DR. AUSTEN:

MGH Can Expect More Very Ill Patients

The MGH's new Chief of Surgical Services believes the hospital will have to wrestle more and more with the special needs of the very sick patient.

"One of the important things," Dr. W. Gerald Austen said in an interview, "for hospitals like this and specifically in departments of surgery is to care adequately for the very ill patient. We are going to have more and more sicker and sicker patients in this hospital, because we are doing all sorts of things we couldn't do before:

"We have 70- and 80-year-olds undergoing open heart surgery; we have complicated transplant, abdominal and thoracic surgery."

Sicker and Older

Sicker and older patients face increased risk from complications and sudden emergencies. How can these risks best be handled?

"Facilities, personnel, organization and modern techniques such as computers and monitoring systems are necessary," he said. "Much more modern equipment will be needed to save the physician's time. Alarm systems like the one in the Coronary Care Unit can give each individual patient the best possible care."

Dr. Austen believes that the intensive care units at the hospital are pioneering in this area and that more such units will probably be needed.

The 39-year-old heart surgeon holds an engineering degree from MIT. He plans to train his engineering eye on various problems to see if with the help of others he can find ways to suggest improvements.

"We have to look at things like the design of floors," he said. "One question is how the rooms are to be designed to best take care of patients with existing personnel.

Wonderful Faculty

"We have a wonderful teaching faculty, superb students and house officers, and an excellently run hospital. There are a lot of things we can do such as increase research and extend present education programs."

DR. W. GERALD AUSTEN

Dr. Austen assumed his new duties as Chief of Surgical Services on April 1. At the same time he became Chairman of Harvard Medical School's Department of Surgery at the MGH.

He had been Chief of the Surgical Cardiovascular Research Unit at the hospital since 1963. At the time of his appointment as Professor of Surgery at Harvard Medical School, he was the second youngest man ever named to that position.

Enrolling at MIT, he intended to follow his father as an engineer. Before receiving his BS in engineering in 1951, however, he had a change of heart.

"I thought it would be more fun to help people," he recalls, "than to build bigger and faster planes."

Followed Brother

His older brother, K. Frank Austen, had already started at Harvard Medical School. Gerald followed him there.

While still an intern at the MGH, the younger Austen built, with others, a heart-lung machine, making many of the parts on a lathe.

Residency in surgery at the MGH and study and service at two British hospitals and at the National Heart Institute in Bethesda, Md., occupied the next few years.

In 1963, he became a Markle Scholar in academic medicine. He was the first surgeon Harvard ever nominated for that honor.

In 1965, Harvard Medical School named him Associate Professor of Surgery. One year later, at age 36, he became a full professor.

Respected by Colleagues

Dr. Austen is respected by his colleagues for combining the best qualities of cardiovascular surgeon, researcher and teacher. His rise at the MGH parallels that of his brother at Robert B. Brigham Hospital where Frank is Physician-in-Chief besides being Professor of Medicine at Harvard Medical School.

Married to the former Patricia Ramsdell of Worcester, Gerald lives with his wife and two sons in Winchester.

He succeeds Dr. Oliver Cope, who has been Acting Chief of Surgical Services since July. Dr. Cope had temporarily taken over the reins when Dr. Paul S. Russell decided to devote all his energies to the increasingly complex task of Chief of Transplantation Surgery.

Volts, Ohms and Amperes: A Potential Danger

(Continued from Page 8)

be as high as 100,000 ohms. If he comes in contact with 110 volts of electricity (a standard wall socket, for instance), the flow through his body will be 0.001 amps, or one milliamp. If he comes in contact with the same amount of voltage on a hot summer day, however, when his resistance is only 1,000 ohms, the flow will be 0.11 amps.

How much flow is dangerous?

"It depends on how it is applied," Dr. Bruner said. "If an electric current is passed through the head, or if you put two fingers into a wall socket, the current will go only through the head, or in one finger and out the other.

"What is most dangerous, especially for ventricular fibrillation (quivering movements instead of regular beating of the heart), is to have the current run through the trunk, say from arm to arm, or from leg to leg."

Damaging Effects

Ventricular fibrillation is one of three damaging effects electric shocks have on the human body; they can also burn and cause severe muscular contractions which may break bones.

Ventricular fibrillation is the most common danger in hospital shocks, and this problem is complicated by the fact that in human beings there are few spontaneous recoveries from it.

"With .001 amps flowing through his body," Dr. Bruner continued, "a person will feel a tingle. At .016 amps, his muscles will contract, and he will be unable to let go, because the flexor muscles are more powerful than the extensors. At .050 amps, he will feel pain and may faint, but his heart and respiratory function will be OK.

"When you get up to .100 amps and on up to 2 or 3, there is ventricular fibrillation; that amount is lethal. At higher levels, however, the heart does not fibrillate. It stops altogether and resumes normally. The victim will live if he survives the burns and respiratory paralysis involved in that great a shock."

However, this outline only applies when the electricity goes through the skin. What happens if the current is applied directly to the heart?

Experiments at Duke University have shown that 20 to 800 microamperes cause fibrillation in dogs. ("Note that we are talking about millionths of an ampere, not thousandths, as we were before," Dr. Bruner stressed.) Humans were found to fibrillate at 180 to 1,500 microamps, well below where anything could be felt if the current were applied through the skin.

Electrical Hazards

"This is why electrical hazards are so crucial in hospitals. If there is any flaw in the equipment that is being used, for instance an EKG (electrocardiograph) machine, or if there is not proper grounding, a possibly lethal current can flow directly into a patient's heart. And there are no safety regulations anywhere that cover this kind of a hazard. The discovery is too new to be covered by law."

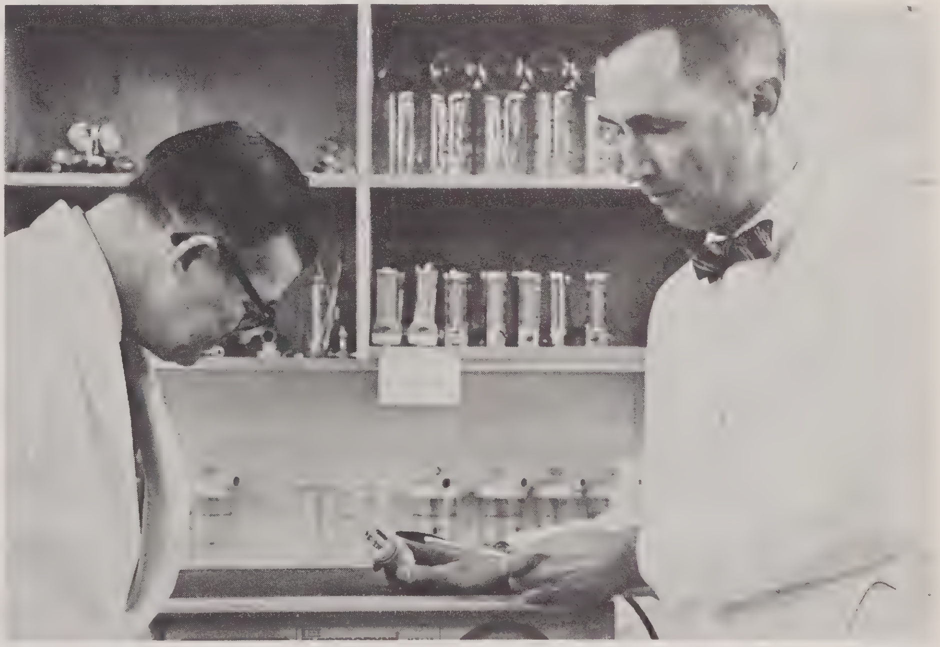
What can be done to avoid potential accidents? Dr. Bruner cited several things: "First of all, every device that is connected to a patient should be at equipotential: the same electrical potential," he said. "If there is no 'pressure difference,' electricity will not flow.

Three-Pronged Plugs

"Secondly, all equipment in a patient's room should have three-pronged plugs and three-holed outlets for the plugs. The middle prong is a ground, and it hits the socket before the other two do, so there is always a ground for the equipment.

"Then, outlets should be bonded together. All the electrical equipment attached to one patient should be attached to a single cluster of outlets, so they have a common ground.

"And finally," he cautioned, "knowledge of the equipment you are using is essential. Make sure that any time you are involved in purchasing new equipment you get instruction in its use, a diagram of its circuitry, and a manual which explains its operation."



Dr. John Bruner (right) showing Mr. Ed Banks, Chief Inhalation Therapist, a sturdy three-pronged plug for grounding electrical equipment.

FORMER MGH INTERN UNCODES GAMMA GLOBULIN

The scientist who headed a recently announced research project marking a milestone towards learning how the body makes antibodies interned in medicine at the MGH in 1955.

Later, Dr. Gerald M. Edelman received a Ph.D. at Rockefeller University to supplement his M.D. The Rockefeller group under Dr. Edelman has deciphered the complete structure of gamma globulin, a complex protein antibody formed by 19,996 atoms. Antibodies are made by the body to fight off invading substances such as a virus or bacteria.

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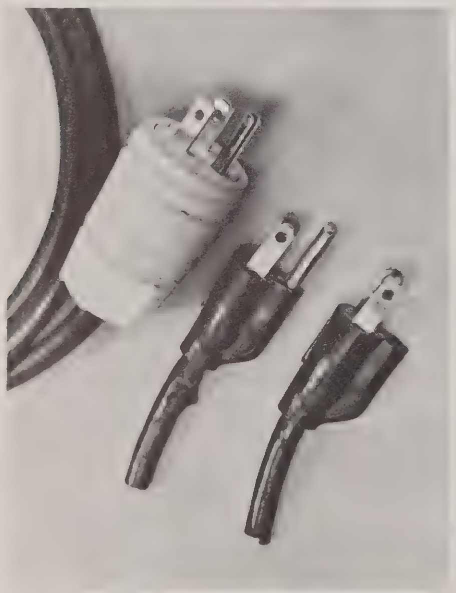
Volts, Ohms and Amperes: A Potential Danger

The speaker was an Assistant in Anesthesia at the MGH. The audience was a group of young nurses. The subject was electricity.

The talk was full of words like "equipotential," "milliamps," "voltage," and "resistance." Seemingly unlikely subject matter for a hospital lecture. But the audience listened intently and asked intelligent questions. The doctor fielded them deftly. What he was saying could save a patient's life.

Safety Measures

Dr. John M. R. Bruner has long been interested in the safety factors of medical electronics. At the MGH, he has been working under Dr. Henning Pontoppidan, Director of the Respiratory Unit, to establish safety measures for the use of electrical equipment. He has been known to use his spare moments to check patients' rooms for proper equipment grounding. "It only takes a minute," he told his audience. "You can do it when you take medicine into a room." So little effort. But so much at stake.



Two different kinds of three-pronged plugs. One at left is virtually indestructible. One at right (duplicate of one in center) shows third prong broken off to make it fit a conventional two-hole socket, rendering it useless for grounding.

Recently, Dr. Carl W. Walter, a Surgeon at Peter Bent Brigham Hospital, estimated that 1,200 patients are accidentally electrocuted in the United States annually while receiving routine tests or treatment. The problem is usually faulty equipment. Dr. Walter got his figure from an actuary for an insurance company which had done a study as a result of many death claims.

His statement is widely disputed. Dr. Bruner and others think that the estimate is high.

Data Not Available

Dr. Bruner, however, concedes that sound data on the incidence of electrocutions is not available, and that some forms of death by electrocution are indistinguishable from death by "natural causes."

How can an electrical accident occur? Dr. Bruner explained in detail:

Electricity is in some ways analogous to movements of liquids. Voltage can be viewed as pressure. It runs from areas of high to areas of low pressure. Between any two wires and between a wire and the earth, there is a pressure difference. Therefore, voltage will flow from one to the other. The direction of the flow is determined by the pressure levels of the wires involved.

Pressure levels are called potentials. The earth is at zero potential, and electricity will always flow, where there is a pathway, from a wire to the earth. Such a flow is called grounding. Grounding can be dangerous, or it can be controlled for safety. Wires can be grounded by attaching them to anything made of metal which is connected to the earth. Wood and rubber do not conduct electricity and are therefore not suitable materials for grounding.

If a person stands on a wooden ladder or wears rubber-soled shoes and grasps only one wire at a time, electricity will not flow through him to the earth, and he will not receive a shock. However, if he holds two wires which do not have protective rubber coverings, or if he holds one such wire and is standing on the earth itself or on something attached to the earth, he will receive a shock.

Critical Combination

The critical combination for shock is physical exposure to a source of power; contact with the earth, either direct or indirect; and moisture, which facilitates the flow of electricity. Normally, the skin has a certain amount of resistance, or acts as a barrier to the flow of electricity. However, if a person is perspiring, resistance is lowered because his skin is covered with a salt solution, which is a good electrical conductor.

"People can be looked at as bags of leather containing a salt solution," Dr. Bruner said. "As long as the leather is dry, resistance is high because leather is not a good conductor. But if it gets wet, it becomes a very good conductor. Resistance of human beings to electricity may be 100 times greater in the winter, for instance, than it is in the summer."

Hazards of shock are not due to voltage, but to flow, which is measured in amperes (amps), or charges per second. Voltage, flow, and resistance vary in relation to each other in a fixed manner, so that if any two are known, the third can be found by computation.

Resistance Varies

Resistance is measured in units called ohms, and amps can be found by dividing the number of volts by the number of ohms. For instance, in the winter, the resistance of a person's skin may

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MGH News

Vol. 28 No. 6 MASSACHUSETTS GENERAL HOSPITAL, BOSTON, MASSACHUSETTS June-August, 1969

Cancer Center Will Offer Best First Chance

To provide cancer patients with their "best first chance" is the aim of a $9 million Radiation Therapy and Cancer Treatment Center planned by the MGH.

The phrase was coined by Dr. Howard Ulfelder, Chairman of the General Hospital Committee in charge of planning the structure. Dr. Ulfelder explained that the new building will give patients their "best first chance" by gathering all kinds of cancer experts literally under one roof.

"The individual cancerologist as the one man band," he said, "faded from the picture. The radiotherapist (X-ray therapist) is the closest thing left. He devotes all his time to treating cancer. The difficulty is that he can't know enough about chemotherapy (drug therapy), hematology (the study of blood), and surgery to serve equally effectively in all these capacities."

Until recently, the philosophy was for various experts to examine and treat the patient in sequence. First one specialist would try his best to arrest or cure the cancer. If he failed, he would then send the patient to another expert and so forth.

"This in today's complex medical world," Dr. Ulfelder said, "would rob the patient of the best first chance. We want to give every patient who comes to this hospital for treatment of cancer such a chance. We do this by letting a lot of people who know a lot about treatment of cancer see the patient at the very beginning."

At cancer hospitals, this philosophy works well because all the experts are gathered under one roof.

"Such institutions," Dr. Ulfelder said, "suffer from one major defect. Doctors seeing only cancer patients think in terms only of cancer. Many cancer patients also suffer from other diseases, however. Diseases like rheumatoid arthritis may get short shrift."

By placing all the cancer experts in one building, the MGH hopes to capitalize on the advantages enjoyed by cancer hospitals. At the same time, consultants are available to advise and to treat secondary illnesses. The cross-fertilization between the cancer experts and other physicians thus keeps the cancerologist from becoming isolated.

At present, facilities are scattered throughout the vast MGH complex.

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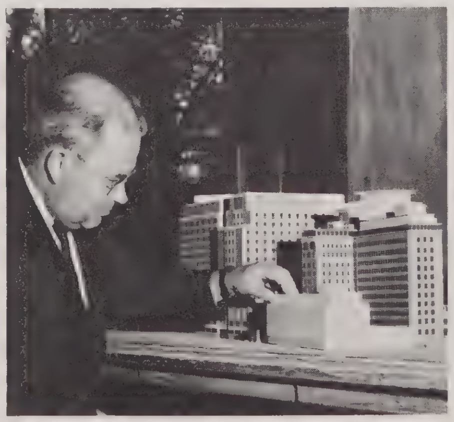

Mr. Carleton Goff, Resident Architect, sets model of newly announced Radiation Therapy and Cancer Treatment Center in place in model of MGH complex.

Born of Polio, Crippled by Vaccine, Revived by Use

(Third of a Series)

Nobody thought back in 1955 that the polio epidemic would spawn a world-renowned MGH unit – especially when the disease began to disappear in the wake of the Salk vaccine.

But the epidemic had fathered the idea, and the resulting Respiratory Unit's success has rapidly made the five-bed section in the Phillips House obsolete. Now the unit which attracts a constant stream of medical visitors from all over the world is beginning a move to a well-equipped 12-bed section in the new Gray Building.

The route from the Phillips House to the Gray Building is a short roller coaster ride of respiratory care history.

In 1955 the polio epidemic gripped New England in a vice of fear.

"The MGH was overwhelmed with patients who couldn't breathe," said Dr. Henning Pontoppidan, Director of the Respiratory Unit. Dr. Pontoppidan is an MGH Anaesthetist and an Assistant Clinical Professor of Anaesthesia at Harvard Medical School.

"It became clear," he said, "that iron lungs were inadequate and that there weren't enough of them."

This experience duplicated one in which Scandinavia suffered an equally severe epidemic in 1952 and had to resort to doctors and medical students to manually ventilate (squeeze air into) the lungs of patients with an anesthesia breathing bag.

"The next step," Dr. Pontoppidan said, "was to produce a mechanical medical student. Thus was the use of

(Continued on Page 4)

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EDITORIAL:

Of Inertia, Apathy and the Student Revolt

Medical Grand Rounds at the MGH reversed the usual procedure when four articulate Harvard Medical School students lectured to their professors. The subject: the recent student strike at Harvard.

The four young men ranged in opinion from partial approval of the demonstration to virtually full espousal of the aims and actions of the militant Students for a Democratic Society which ignited the strife. To treat in a brief editorial the full range of complex issues involved would do them an injustice. In highly general terms, however, there is much to be said for the student-raised issues and much to be deplored about some of their methods and their anarchistic dearth of alternatives to what they dislike.

But a point underlined by one of the four students deserves elaboration. He said that only a small minority of Harvard University students supported the SDS actions. What bothered him was the apathy which he states enveloped most of his medical school colleagues during the strike vote.

"They wouldn't even drive over to Cambridge to vote," he said. "If everyone is so interested in what the minority is doing to the majority, why doesn't the majority stand up and be counted?" The speaker concluded sadly that the majority didn't care that much.

Whether his indictment of his colleagues is valid is questioned by other students. The fact remains, however, that except at times of crisis such as student demonstrations, inertia and/or apathy rule the campus. That is the core, really, of what is wrong not just with universities but with society in general. We complain about our political leaders in Washington, in the state houses and in the city halls of America. We condemn racial bigotry, decry crime and corruption, deplore the level of morality, and moan about high taxes.

But racial bigotry, crime, corruption and the like cannot exist in a vacuum. They thrive on the inertia and/or apathy of citizens. A hospital needs the best efforts of its employees to become a great one. A city cannot serve its people unless they are willing to give up some of themselves in turn to serve it. An enlightened, active citizenry can volunteer to help with many of the details that make it possible to better our society. Whether it is raising money for scholarships or helping a hospital's volunteer program, much can be done. People who won't spend the time to help their own organizations or communities with the nitty-gritty are all too common. Only a few are willing to devote their energies to a good cause. As for the rest:

"They wouldn't even drive over to Cambridge to vote."

Letters to the Editor

My old and valued friend, Dr. George Berry, sent me your February issue with its delightfully surprising editorial on my work. Please thank very much whoever is responsible for it, for it is highly perceptive in its understanding of my real motivation in doing all this – our obligation to play it straight with the young.

In connection with this you might be interested in becoming aware of some of the concerted attacks, now being made on SIECUS (Sex Information and Education Council of the U.S.) and on me personally, stemming directly from obvious sources as illustrated in the enclosed materials.

I don't think that I or SIECUS itself with its highly distinguished board, on whose behalf I speak, will be the ones to suffer. Rather it will be the small, timid efforts to open up the topic of sex education at the community level in order to involve those responsible for doing it (home, school and church) in better approaches, that will be knocked on the head.

We are seeing this happening, and the one thing that can save these beginning programs is if the leaders of the community, most especially the physicians and the clergy, stand up before the community to be counted in support not just of programs, but of the need of young people for an intelligent, honest approach.

Mary S. Calderone, M.D.
Executive Director, SIECUS

Dear Editor:

In the memoriam to Dr. Edward L. Young, it is stated that White Cross was a forerunner of Blue Cross-Blue Shield. This is not an accurate statement.

Massachusetts Blue Cross came into being in 1937. Because of a split in the Council of the Massachusetts Medical Society, Blue Shield and the White Cross came into being in the very early forties at essentially the same time.

Charles G. Hayden, M.D.
President, Blue Shield

(*Editor's note:* Blue Cross, a prepaid hospital insurance plan, began operating in Massachusetts Sept. 7, 1937; White Cross began service Mar. 1, 1940, and Blue Shield started operating Nov. 16, 1942, as prepaid insurance plans for doctors' bills.)

Cancer Center Will Offer Best First Chance

(Continued from Page 1)

There is also a space shortage. All the nooks and crannies combined that are now devoted to cancer fall short of needs.

Plans approved by the Board of Trustees and General Director John H. Knowles call for the demolition of the Thayer Building, probably sometime in 1970. Construction of the new building will begin on the Thayer site in 1971. Most occupants of Thayer will be housed in temporary structures.

A five-story building will rise above the location at Blossom and Charles Streets. Housed will be a vast array of modern radiation therapy equipment, patient rooms, physician offices, and research laboratories.

Thus, the first general hospital ever to establish a tumor clinic will provide the most modern equipment and facilities available to treat cancer and to seek new ways of treating and curing various types of the disease.

After its establishment in 1925, the MGH Tumor Clinic became a model for other general hospitals throughout the country. The MGH Radiotherapy Department was one of the first in the United States to use high-voltage radiation therapy.

Van de Graaff

The hospital bought its first Van de Graaff machine in 1940. Four years earlier, the Huntington Memorial Hospital (which later joined the MGH complex) had set up a similar unit.

In its Radiotherapy Department Chief, Dr. Milford D. Schulz, the MGH has the radiotherapist with the longest experience in the use of supervoltage X-ray therapy of anyone in the country.

Each year, the hospital treats more than 3,200 new cancer patients. In fact, one of every three Massachusetts residents receiving radiotherapy is treated at the MGH. About one in 10 radiotherapy patients here comes from other New England states.

The hospital hopes to use its new facilities to reduce the annual toll of 10,300 cancer deaths in Massachusetts.

Radiotherapy is the chief weapon. High-voltage modern equipment with its short X-ray wave attacks the cancer more effectively than ever before.

The shorter wave produces less injury to nearby normal tissues and causes less pain. Early treatment with high-voltage machines can cure cancers of the skin, head, neck and uterus, and control many other types. The various forms of cancer strike 19,000 more Massachusetts residents each year.

Cure One of Four

Even incurable patients get relief from pain with the type of equipment that the new building will house in greater quantity and in more advanced forms than are now scattered throughout the complex. And often their lives can be prolonged comfortably for years.

Such equipment is one of the reasons that the MGH is now curing one of every four cancer patients treated. That makes cancer more susceptible to modern medicine than are most other major diseases.

To reinforce radiotherapy, all means of treating cancer will be available in the new building. In many cases, drugs or surgery will offer the first line of defense.

The new building will provide transient rooms for patients needing drug treatment. Often chemotherapy in cancer demands that a patient stay overnight. At the same time, such treatment is not drastic enough for regular admission to the hospital. The short-term-stay beds should provide the answer.

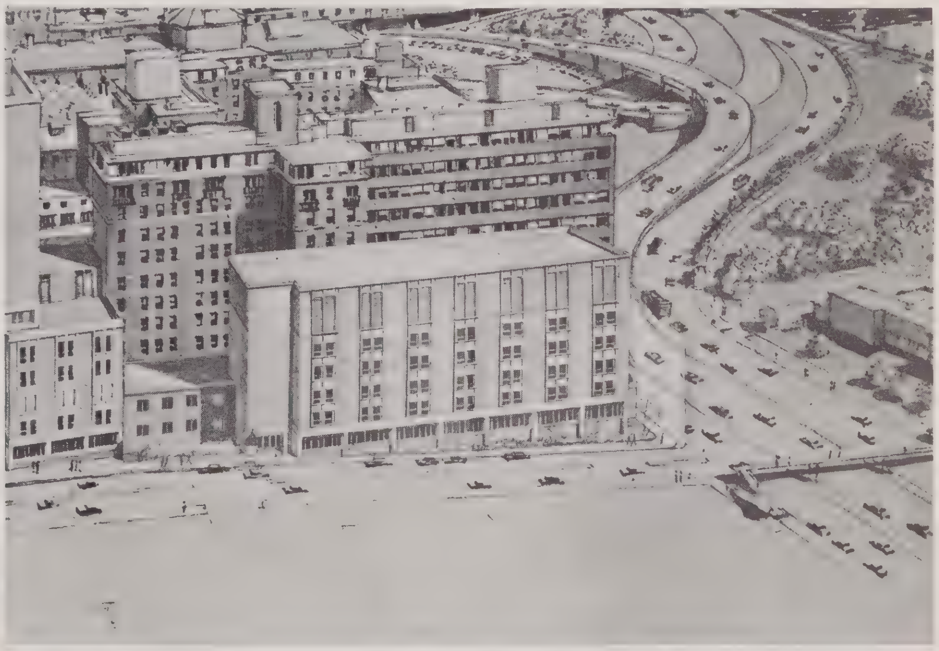
Two Different Approaches

Research will attack cancer from two different approaches. In one, the researcher will continue present studies designed to evaluate the effectiveness of treatment. Is a given anticancer drug, for example, providing a great deal of help to a patient? Is it causing undesirable side effects?

In the second approach, investigators will undertake basic studies. One of the key questions they will be investigating is why normal tissues recover much more quickly than cancerous ones from radiation therapy.

Researchers want to explain the difference in the recovery with the hope of increasing it. Such an increase would make it possible to treat cancerous tissues more effectively with less damage to normal tissues.

The *MGH News* welcomes letters from its readers. To avoid condensation, letters should be brief. They must be signed and should contain the writer's title or department at the MGH and home address. Names will be withheld on request.



Artist's drawing of planned Radiation Therapy and Cancer Treatment Center. At left is a portion of Gray Building and in background is Warren Building. Storrow Drive is at right.

INTENSIVE CARE UNITS, PART THREE:

Respiratory Unit—Born of Polio, Crippled

(Continued from Page 1)

a modern, controlled, positive-pressure breathing apparatus (respirator) pioneered in Scandinavia in 1952 and duplicated here in 1955. In the latter year at the MGH, patients who required breathing with iron lungs, doctors, students and respirators were concentrated on the 11th floor of the White Building. This nailed the concept of a Respiratory Unit on the wall."

When the polio epidemic subsided, the need for respirators fell dramatically. Only patients with ailments like polyneuritis (a polio-like ailment) and myasthenia gravis (a disease involving progressive paralysis of muscles) were still on the respirator. Then specialists began to recognize the need for such devices in a variety of conditions not involving paralysis.

Other Conditions

Crushed chests suffered in accidents was one. Comas produced by drug poisoning was another.

By far the largest number of new candidates were people who had undergone major chest or abdominal surgery. It was found that both groups were particularly prone to postsurgical lung complications which the respirator could help overcome.

Since the lungs are located inside the chest wall, the pulmonary (lung) complications that result after major chest surgery are not surprising. The tie-in with major abdominal surgery, however, is more subtle.

From each of two nursing stations in new Respiratory Unit, all 12 patient cubicles can be observed. Unit will open soon.

"Most of the breathing," Dr. Pontoppidan explained, "is done not with the chest wall but with the diaphragm. Such breathing becomes painful with an abdominal incision.

"If left alone, the patient tends to breathe shallowly to reduce pain. As a result, the lungs tend to collapse.

"The pain also makes the patient dislike coughing. If he doesn't cough secretions up, they accumulate and block off the bronchi (large air passages within the lungs).

Severe Asthma

"The incidence of pulmonary (lung) complications is as high among people with major abdominal surgery as thoracic (chest) surgery.

"Other patients who may require ventilation are those with severe asthma, emphysema and chronic bronchitis, massive obesity, and thymectomies (surgical removal of the thymus gland)."

A patient who suffers cardiac arrest (heart stoppage) is often saved by chest massage with the heel of the hand. Sometimes that procedure painfully bruises the ribs so that he cannot breathe properly without a respirator.

Patients now go on the respirator routine for a day or two after open-heart surgery.

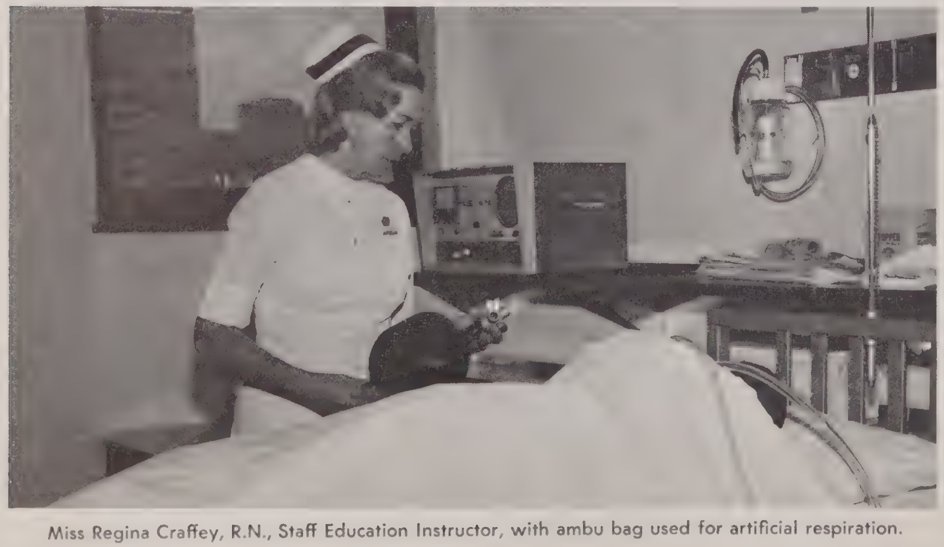
The result of all the new uses for respirators is a tremendous increase in the number of patients treated. In 1958, the MGH treated 66 patients with the respirator. In 1968, the number had swollen to 965.

"The trend is still upward," Dr. Pontoppidan said. "As the number has grown, we have been able to admit an increasingly small fraction to the Respiratory Unit. In 1961, we could take almost all of the patients who were on ventilators. Last year, only one in 10 could come to the Respiratory Unit."

12-Bed Location

That is the crisis which necessitated the new unit in the Gray Building. In its 12-bed location, the Respiratory Unit should be available to a much higher percentage of respirator patients.

The location in the Gray Building is closer to the surgical and medical wards from which most of the Respiratory Unit patients come and next door to the new Surgical Intensive Care



Miss Regina Craffey, R.N., Staff Education Instructor, with ambu bag used for artificial respiration.

Vaccine, Revived by Use

Unit. In planning, is a new cardiorespiratory study area equipped with sophisticated instruments. Patients can be wheeled into that room for special procedures and studies important to their care.

Trained Nurses

The core of trained nurses in the new unit can easily observe all patient cubicles from the two central nursing stations. A large amount of circulatory and respiratory monitoring equipment will increase their detective ability.

"We will have to make more use of nurses' aides and technicians, too," Dr. Pontoppidan said. Working under Dr. Pontoppidan and two other staff anesthetists, Drs. Bennie Geffin and Kenneth Travis, will be three resident physicians and two or three clinical and research fellows. Most of that team of physicians will also be anesthetists, but some other specialties will be represented.

Since they involve the sickest patients, stays in the Respiratory Unit are longer than those of respiratory patients in other areas of the hospital.

"Even though the unit takes only one in ten ventilator patients," Dr. Pontoppidan said, "unit patients account for one-third of the patient days. The average stay in the unit now is about 20 days instead of the 10 to 12 of 1962."

While the stay has nearly doubled, the death rate has halved (from 38 per cent when the unit opened in 1961 to 19 per cent last year).

The same qualities that increased the length of a patient's stay had much to do with the lowering of the death rate.

"An important factor," Dr. Pontoppidan said, "is the very meticulous, almost perfectionist approach to the care of the patient. We must look after every minute detail because we never know when failure to do so will threaten the patient's life."

In the early years of the unit, the physicians and nurses were preoccupied largely with providing the best mechanical means for artificial breathing.

Can't Wait a Day

"Gradually over the years," Dr. Pontoppidan said, "we have learned more about the physiology of respiratory failure. We have learned to recognize it early and prevent some of the complications from prolonged ventilation.

Dr. Bennie Geffin uses syringe (in right hand) to inflate balloon used in tracheotomy procedure done to make a patient's breathing easier. Dr. Geffin devised the low pressure, fluffy device with two MGH surgeons, Drs. Hermes C. Grillo and Joel Cooper.

"One can't afford to wait until the next day to treat complications. It is essential to step right in and reverse any undesirable trend. This means the patient can never be left unobserved. It's just too dangerous. There is round-the-clock physician coverage.

"Nurses are extremely skilled in observing and caring for the patients and are a great help, particularly to inexperienced physicians, in pointing out when something isn't right."

The MGH physicians have learned to adapt to the bedside a number of tests that can reveal the first signs of impending trouble. Much of their research has been geared to putting enormous amounts of theory to work for the patient too sick to be moved to a physiology laboratory.

Possible complications from prolonged ventilation are numerous. Although one-fifth of the air consists of oxygen, oxygen in high doses is poisonous. The Respiratory Unit team has learned to pay strict attention to that danger.

Prolonged ventilation, the MGH group discovered, results in patients retaining fluids. The added fluid can cause a general weight gain and also clog the tissues and air spaces of the lungs.

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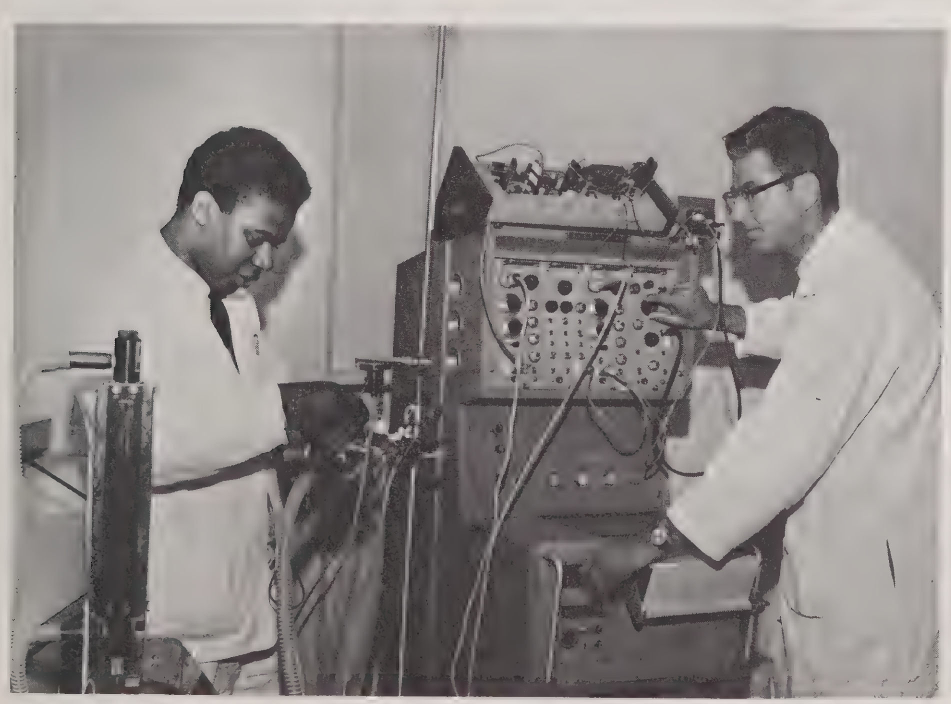


Dr. Henning Pontoppidan, right, Director of the Respiratory Unit, and Sylvester (Nick) Barker, Chief Respiratory Laboratory Technician, calibrate a pneumotachygraph, an instrument for recording the velocity of breathed air.

(Continued from Page 5)

To combat these hazards, nurses weigh the patients daily. (Scales built into the beds make this an easy task.) At the first sign of trouble, the physician restricts the fluids given the patient intravenously or in his diet. Drugs (diuretics) to help eliminate fluids are ordered.

Proper Pattern

The MGH group has also gained more skill in the intricacies of providing a proper pattern of inflation and exhalation of air. Muscles are used normally to slow expiration. Some problems, such as excessive lung fluid, tend to stiffen the lungs. As a result, they act like strong springs and empty the air faster.

The physicians have learned how to slow down exhaling. This is effective in keeping air spaces open to receive more air in the next breath.

The doctors have also learned how best to imitate nature's way of handling the inhaling pattern of normal, healthy persons.

Another problem involves making a hole in a patient's windpipe (tracheotomy) to insert a tube. Done to make breathing easier, the procedure involves using a balloon with a cuff. The balloon often damages the trachea (windpipe).

Two MGH surgeons, Drs. Hermes C. Grillo and Joel Cooper, and Dr. Geffin from the Respiratory Unit have devised a low pressure, fluffy balloon. In patient trials to date, the device seems to have eliminated complications.

The researchers here and in other hospitals are also learning that it sometimes helps to use high pressures of air and oxygen with the respirator. One case this year illustrates how complicated and important the treatment can be.

A delirious, 37-year-old woman was admitted through the Emergency Ward. Breathing rapidly, she was also suffering hallucinations and had chest pains and fever. Doctors diagnosed her case as a bacterial (pneumococcal) type of pneumonia.

Feared for Life

After standard respirator treatment, the woman's condition got worse. Doctors feared for her life.

Over the next few days, they resorted to unusually high airway pressures during exhalation ("pressure panting") combined with heavy sedation with morphine. Careful regulation of body fluids plus all the other sophisticated techniques they have learned came into play.

The carefully balanced treatment worked. By her 12th day in the hospital, she had passed through the dangerous part of her ordeal. Ten days later, she could breathe normally without the respirator, and she recovered without further setback.

(*Series to be Continued*)

Miss Lillian (Pat) Davis, R.N., Nurse Respiratory Therapist, adjusts respirator.

Richardson Lecture: Recent Burn Findings

The assumption that certain areas of burned tissue are always dead is "a fairy tale of science," according to Mr. Douglas Jackson, Chief in Charge of the Birmingham Accident Hospital and Rehabilitation Center in Birmingham, England.

Mr. Jackson made that statement in his Edward P. Richardson Lecture, "Findings from Recent Burn Research at the Birmingham Accident Hospital."

Mr. Jackson, who is an M.D. but is designated "Mr." according to British custom, explained that there are three zones in any serious burn: the outside area, which is red and is called the zone of hyperemia; the center area, which is white and is called the zone of coagulation; and the area between the two, which is also white and is called the zone of stasis. The two white zones have usually been assumed to be dead tissue because there is no apparent blood supply to them: not only are they white in color, but they do not blanch when pressure is applied.

Skin Grafting

Recently, the Birmingham Hospital has been using a method of skin grafting developed in Europe which involves excising (slicing off) skin layers down to bleeding dermis (a deep skin layer) and then applying grafts. It was found that the zone of stasis supports a graft, indicating that it is alive; but no capillary circulation was found, indicating, by definition, necrosis (death) of the tissue.

The Birmingham group also tried grafting on unexcised burn surfaces. The grafts took and then came off, results which had been obtained by doctors in Houston, Texas, as well.

In addition, Mr. Jackson and his team have found that red areas are not necessarily shallow and that white areas are not necessarily deep, as has traditionally been assumed.

He concluded by saying that definite answers have not been found to any of the questions raised by this research, but that excision and grafting have made it easier to study burns in vivo (in the living body) and that the Birmingham studies have provided new ways of looking at things which may produce answers in the future.

Adolescents in Crisis: Answering Their Pleas

(Continued from Page 8)

though they could call back later if necessary.

Once it has been determined that the situation which brought a patient to the clinic is in fact a crisis and not a visible sign of a serious underlying disorder which has not been evident before, the patient is accepted for crisis intervention. Family or individual therapy is prescribed: usually one session a week for four weeks. The clinical staff has found that this is sufficient time to resolve almost all crises. Some are resolved before the time period is up, but all patients have been seen for four weeks for research purposes.

At the end of this period, an evaluation is made, and the patient is not seen again, unless he chooses to continue therapy, until a follow-up study is conducted a year later. The plan has proved to be very successful. Only a few patients have chosen to continue treatment.

In a paper presented at the American Ortho-Psychiatric Association convention, Dr. Christ, Marvin Snider, Ph.D., the family therapist, and Shirley Goldstein, M.S.S., social work supervisor for the Outpatient Clinic, said that the project was undertaken because "traditional methods of dealing with adolescents in outpatient clinics [had] proved so woefully inadequate." The paper was prepared with the collaboration of Dr. John Spillane, a psychiatrist who is a member of the clinical team for the project.

Because families are intimately involved in adolescent crises, the team cited as the main variable they were investigating, the question "to what extent is the family either creating the crisis or contributing to it?"

They believe that "in many family therapies, the issue of the parents' marriage is an important and often very painful one. The cases where an adolescent crisis bespeaks a more or less chronic state of dissatisfaction in the parents' marriage are the majority rather than the minority."

It was with this fact in mind that the two-option treatment plan was set up. Thus adolescents like Libby, whose crises stem from family difficulties, can be seen with their families, and everybody's problems can be dealt with together. Adolescents, on the other hand, whose problems are basically internal, like an identity crisis, can be seen alone for individual therapy.

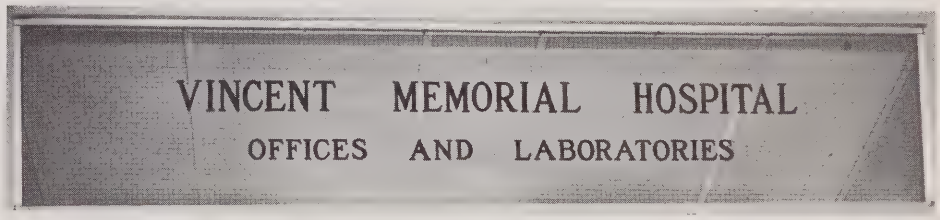
Libby's parents began to work out some of their marital problems during the therapy sessions, and as their difficulties were eased, so were Libby's. The parents realized that they had neglected both of their children due to their preoccupation with their own problems, and having recognized this situation, set about correcting it. The follow-up study showed that Libby had adjusted well with the love and support she had finally found at home.

Statistical results are not yet in on the study, but some clinical findings have been formulated. Dr. Christ and his associates feel that they have found a method of dealing with adolescent crisis that is different from the more common "individual-only" approach in psychiatry. Contact within the three settings of people mentioned is the most important aspect of this method.

The fact that adolescents often act as spokesmen for a family crisis rather than for themselves, while recognized before the study was undertaken, has been clearly demonstrated in many cases.

And the McLean team has found that both individual and family-oriented crisis interventions are effective ways of dealing with crises, but that something different is achieved in each method. Family intervention focuses on the goal of getting over the crisis and leads to a quick resolution of problems. Individual intervention, on the other hand, brings something to the adolescent that family intervention cannot: it opens the way for further development through self-understanding.

Continuation of the project has been approved by the NIMH, but because of lack of funds, it has had to be abandoned.



The Vincent Memorial Hospital Laboratory is celebrating its 25th anniversary this year.

The laboratory was not part of the original hospital which was founded in 1891 and which moved to the MGH to become its gynecological service in 1940. Rather, it came into being in 1944 when Dr. Joe Vincent Meigs, then Chief of Staff of the Vincent Memorial Hospital, agreed to have Dr. George N. Papanicolaou's vaginal smear test for cancer tried on the patients in the gynecological service.

The confirmation of the test by this and other labs, which were among the first to try the technique, established its usefulness in the cellular diagnosis of early cancer of the cervix.

By the time the lab moved from its temporary quarters in the White Building to a permanent space in the new Vincent-Burnham Building in 1948, the value of the method had been so clearly demonstrated in the diagnosis of cancer of the uterus and cervix that it had become part of the routine diagnostic procedure.

By 1955, however, it was clear that the cancer research which had grown out of the test's use was becoming too broad for a small laboratory to handle, and soon after Dr. Howard Ulfelder succeeded Dr. Meigs as Chief of the Vincent Staff, research was focused on the ovary. Two major projects, still underway, were begun: Dr. Janet W. McArthur's research on stimulation of the ovary to form ova, or eggs (March *MGH News)* and Dr. George Richardson's research in the synthesis of female sex hormones.

When the Vincent Memorial moved to the MGH in 1940, it retained its own identity, trustees, and staff.

Major support of all activity of the hospital, including laboratory research, came then and still comes from the Vincent Club, a 1,500-member women's organization whose purpose is to raise money for the hospital.

The club sponsors the annual Vincent Show, a theatrical production which nets increasing financial support each year. This year's production, "Now Is," was held April 8-12.

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Adolescents in Crisis: Answering Their Pleas

Under the glaring fluorescent light above the sink, behind the door which shut her off from another of her parents' arguments, Libby took out a razor blade and rolled up her sleeve. . . .

Three days later, her wrists bandaged tightly, Libby and her parents were waiting in a large first-floor room in the Outpatient Clinic at McLean Hospital.

"She's been doing badly in school, and she's seemed withdrawn from her friends," her mother had explained on the phone, "but we never thought it would come to this."

Libby's case is not unusual. Incidents such as this can be classified, according to Dr. Jacob Christ, Psychiatrist in Charge of the Outpatient Clinic, as "adolescent crises." So can running away from home, taking drugs, being arrested, or any of a number of other problems which may require referral to a psychiatrist. These crises characteristically involve a change in the environment of the adolescent rather than in himself.

Treatment is therefore aimed not at the individual, as it is in most psychotherapy, but at the situation which gave rise to the crisis. Such treatment is known as "crisis intervention."

McLean has set up a unique plan of crisis intervention to deal with these incidents, which are a major source of adolescent referral to the Outpatient Clinic. Under a research project called "Adolescents in Crisis," funded by the Division of Studies on Suicide Prevention of the National Institute of Mental Health, members of the clinic staff evaluate each case through a series of interviews and decide on a course of treatment.

While Libby was interviewed by a psychiatrist, her parents were seen by a social worker who discussed with them their relationships with Libby and with each other. Later, the entire family, including Libby's brother, was seen by a clinical psychologist who is an expert in family therapy. During the course of these interviews, Libby's parents began to see, for the first time, that they had contributed to the situation which led to her suicide attempt.

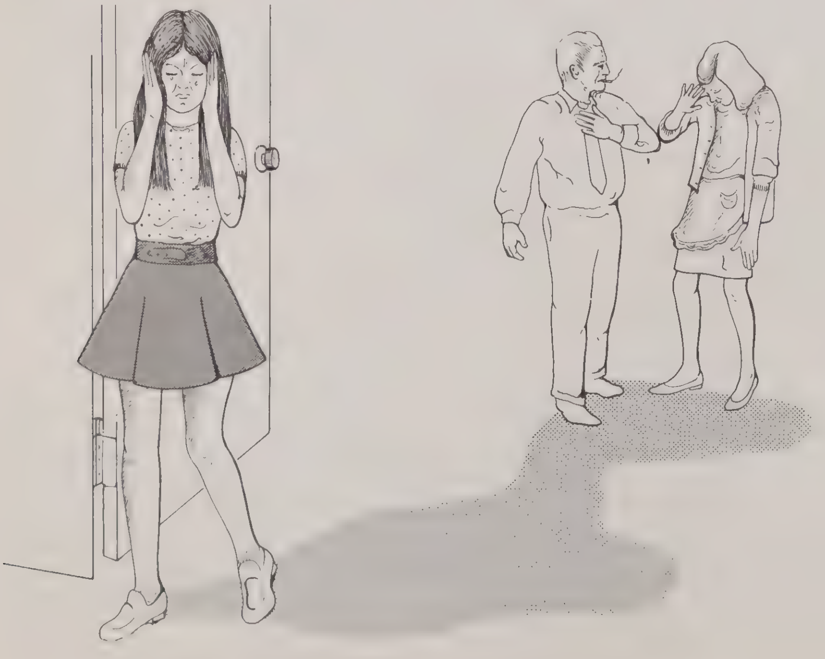
One of the most useful aspects of this team method of evaluation is that it allows the therapists to observe the individual adolescent, his parents, and his family as a whole, thus providing fairly complete information on a given situation. The information gathered in each session differs, and comparison of notes makes it possible to see how the different dimensions of a problem fit together.

It often happens that it is not just the identified patient who is in need of help. In many cases, the crisis is more directly related to the family situation than to the individual himself. Less often, it turns out the patient is not in need of help at all. His behavior may be considered to be adaptive to a disordered situation in which he is forced to live.

A 14-year-old boy who periodically broke furniture in order to reunite his alcoholic parents when they threatened to break up their marriage is an example of such a situation. Factors like these must be taken into consideration in deciding on treatment.

In Libby's case, psychiatrist, social worker, and psychologist got together after the family interview to evaluate the family and to agree on a course of treatment. Libby's problem seemed to stem to a large extent from her parents' marriage difficulties rather than from within herself, and family sessions seemed to be the best course to follow. Libby, her brother, and her parents were advised that they would have four such sessions with the psychologist and that treatment would then be considered completed, al-

(Continued on Page 7)



An adolescent's family situation is often an important factor in a crisis.

MGH
News

Vol. 28 No. 7 MASSACHUSETTS GENERAL HOSPITAL, BOSTON, MASSACHUSETTS September, 1969

Dramatic Start Launches Tele-Psychiatry Program

"You remember reading about that guy who shot up all those people?"

The questioner glared defiantly at the image on a television screen in front of him. Aside from the picture of a doctor on the screen, he was alone in an examining room at the MGH's Logan Airport Medical Station.

"I'm gonna do the same," he said. "Sure I'm gonna get killed. But I'm gonna take a lot of people with me."

Minutes later, a lone tear rolled down the cheek of the burly man. On another TV screen three miles away at the MGH, Dr. Thomas F. Dwyer could see the tear glisten in the television lights beaming down on the angry, confused patient.

Dr. Dwyer reassured the truck driver that he was "not a sissy" for crying. His own hair bristling from the aggressive man's threats, Dr. Dwyer nonetheless appeared calm on the TV screen in front of the patient.

Over the next half hour, he convinced the man that mass murder, or any form of violence, would solve nothing. Dr. Dwyer continued to stress that theme at subsequent television interviews, encouraging the man to turn to other answers.

In the fifth and final session, the patient agreed he desperately needed someone to help him deal with the aggressions that arose from his nagging distrust of people.

He agreed to entrust his care to another psychiatrist on a regular basis.

That case last spring delighted Dr. Dwyer. For he recalled that the patient had originally wandered into the

(Continued on Page 4)

Out of the Worst of Times: "A Big Advance"

(Fourth of a Series)

June 1968 was the worst of times for MGH nurses caring for open-heart patients.

With nearly 100 fewer staff nurses in the hospital than in June of 1969, a nursing shortage was gripping the MGH. Things were especially bad in the area of heart operations. Patients who had undergone open-heart surgery were scattered throughout the nine patient floors of the institution's Baker Memorial building and the seven floors in the Phillips House.

"Because of that critical nursing shortage," said Nursing Department Director Miss Mary E. Macdonald, "we could not deliver the specialized care in the quantity needed since patients were scattered on every floor."

Driven by the crisis, the nursing department met with key physicians. Out of that meeting, a plan evolved. The connected 12th floors of the Warren and Baker Buildings were designated a Cardiac Surgical Care Unit under the direction of Dr. W. Gerald Austen. (The Harvard University Medical School Professor of Surgery is now also Chief of Surgery at the MGH.)

"Despite the critical shortage of nurses during the summer months," Miss Macdonald recalls, "the regionalization of cardiac surgical patients on Warren-Baker 12 was effected quite smoothly."

Nurses assigned to the unit were amazed.

"Within two days," Miss Joanne E. Buda, RN, said, "we got 19 cardiac care patients."

Just having all of them in one location was a big help. For the first time all the nurses and equipment needed to care for the special problems of those patients were grouped with them.

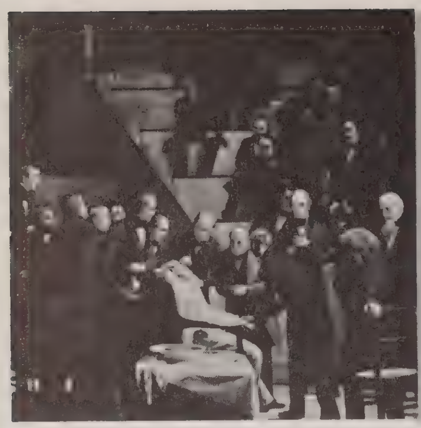
Yet the grouping was only a start. Aside from the Coronary Care Unit, the hospital lacked a team of nurses with the highly specialized cardiac care training needed. On the other hand, a nurse clinician, with the required knowledge and skill, was available to educate a team.

Several members of the newly assembled staff attended a Cardiac Nursing Workshop in Nashville, Tenn.

Back at the MGH, the nurses held

(Continued on Page 6)

Covering face during painful moment of self-discovery is fairly common in psychiatric interview.



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EDITORIAL:

A Need for Balance

A change in the mood and goal of today's medical student is becoming apparent.

Dr. Perry J. Culver, Associate Dean of the Faculty of Medicine for Admissions at Harvard Medical School, described the phenomenon in an article on page 3 of this issue. Many of the younger students at Harvard, as he sees them, seem impatient with the mechanics of medicine – the thorough scientific foundation a practicing physician needs. It is his impression that serving people is so important to these young men and women they lose sight of the necessity of acquiring a skill with which to do so.

So wrapped up in society's problems are they, in Dr. Culver's view, that they may overlook some of the scientific detail needed for good patient care. So concerned are they with the immediate urgency of society's ills, that they disparage the necessity of research to discover solutions to some of the world's medical problems – solutions that seem far off to the impatient young. A pendulum swing away from a major interest in research may well be in process. But like all pendulum swings, this one could tip too far in the other direction.

Idealism and impatience have always been special attributes of youth. And possibly the mood of the younger medical students is just symptomatic of the activism and radicalism that are sweeping colleges and universities all over the world. Some say this activism will dissipate later in the realities of day-to-day living.

So, perhaps as the students mature and realize the foundation of science necessary to perform a doctor's task, they will mellow and abandon their criticism of the "blindness, impersonality, paternalism and racism" of medicine as they view it today. Perhaps as they enter practice and face the realities and responsibilities of the world beyond the campus, they will become indistinguishable from the classes of medical students which have gone before them.

But there is another distinct possibility: That the newest crop really is different, and that its desire to change the world will endure. If this is true, even the end of the war in Vietnam will not, as some conjecture, end the unrest and social concern of this group. Perhaps this generation will go on to bring about social and medical reform.

However, in order to do so, the student will have to learn that idealism alone will not suffice.

To be most effective, a balance must be struck between idealism and knowledge. Idealism and discontent are great American traditions, but without the partnership of technical know-how and attention to detail the goals and reforms will never be effected. Pure idealism can be self-defeating if not diluted by the stark truth of expertise.

Letters to the Editor

Dear Editor,

Would you be interested in publishing this poem in memory of Joseph Bion Philipson, M.D., who was killed in Vietnam in March, 1968, while serving in the Army?

[Dr. Philipson graduated from Harvard College in 1959, magna cum laude and Phi Beta Kappa, from Harvard Medical School in 1963 and completed internship at the MGH in 1964. After two years of surgical residency at MGH, he took a leave of absence to enter the Army in 1966. Dr. Philipson had been in the Delta eight months when he was killed while caring for wounded soldiers. He was awarded the Silver Star for heroism.]

FOR A YOUNG SURGEON, KILLED IN VIETNAM

What canon in God's or Nature's laws
Can justify to man a cause
Which honors the gifts and grace
  of youth –
Anguish, compassion, human faith –
With barren death in a bloodied land,
Wrapped in a tattered shroud?
Who must go next to serve this
  useless cause,
And sacrifice his heart for
  hollow laws?

MICHAEL M. STEWART, M.D.

(*Editor's Note:* Dr. Stewart until the end of June was a Senior Resident in Medicine at the MGH. He is now in Bangkok, Thailand, serving with the Rockefeller Foundation as Chief Resident of Medicine for a hospital there).

* * *

The *MGH News* welcomes letters from its readers. To avoid condensation, letters should be brief. They must be signed and should contain the writer's title or department at the MGH and home address. Names will be withheld on request.

New Med Students—A Reflection of the Times

Harvard Medical School's policy of admissions has not changed but the medical student has – several times, in fact, in the past 25 years.

Medicine is now attracting a different type of student, according to Dr. Perry J. Culver, Associate Dean of the Faculty of Medicine for Admissions at Harvard Medical School.

The physician, who is also Clinical Associate in Medicine at Harvard and Associate Physician at Massachusetts General Hospital, told an MGH Medical House Officers luncheon meeting that the admissions committee does not try to select a special prototype of medical student.

"The students accepted just reflect the preparation and interests of the applicants," Dr. Culver said.

Paradoxically, in spite of increasing scientific background of the entering medical students today, "very few seem interested in basic science research anymore," Dr. Culver said.

Generation Gap

". . . The generation gap between the first-year class and the second-year class was tremendous last year. The upper three classes speak the classical language of medicine."

He characterized the first-year group as, in general, idealistic, deeply interested in serving people, but impatient with the scientific method. Inductive rather than deductive, they want action now. "Many would," he suggested, "rather talk to a patient briefly and guess at a diagnosis than go through the scientific process of history, physical examination, laboratory tests and differential diagnosis.

"Hopefully," Dr. Culver said, "by their second year, they will see the need for solid science background in medicine, and also the need for research. Otherwise, medicine will lose its impetus to move ahead.

". . . Another change in the past year has been the concerted effort of American medical schools to encourage members of racial minority groups to enter health careers. As a result of active recruitment by Harvard Medical School, the class entering this fall will include 17 black students of the 22 who were offered places.

"In recent years the able black students had little interest in medicine, but were persuaded to accept careers in industry, teaching and social work. This year Harvard Medical School had six times as many black applicants as in previous years.

"In spite of the pressure from many groups to accept a representative number of each, regardless of qualification," Dr. Culver said, "and in spite of the overall increase of qualified applicants, the criteria used to choose the new class at Harvard have not changed.

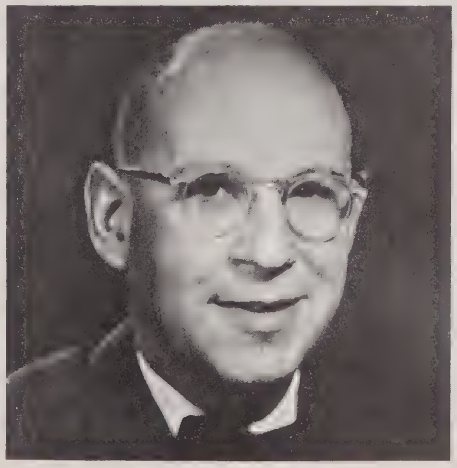
"In addition to intellectual capacity and academic achievement, the admissions committee is still looking for enthusiasm for medicine, common sense, judgment, maturity, a concern for social problems and interest in working with people."

Changing Patterns

Dr. Culver traced the changing patterns of medical school applicants over the last few decades. Before World War II, the big man on campus in extracurricular activities as well as academic achievement was the kind of student most often accepted. He most frequently became a general practitioner upon completing his medical education.

Following the war, the trend turned toward specialization, due to both the pressures of growing medical knowledge and the better careers available to specialists.

About 1958, after the Russians launched their first Sputnik, and Washington launched a drive to emphasize mathematics and science, medical school applicants also became more interested in careers in scientific research and teaching.



DR. PERRY J. CULVER

Dr. Culver called the years 1958 to 1967 the "era of molecular biology."

"Students saw science as the foundation of medicine, and molecular biology as the base of the scientific approach," he said. "Research challenged this group. It became their main reason, along with teaching, for entering the medical field. The care of patients as a full-time career seemed less exciting."

Disillusioned

In 1966 and 1967 applicants who had majored in mathematics and physics began to replace many who were previously interested in molecular biology. "While many of these applicants came from engineering schools, others left successful careers in the electronics industry," Dr. Culver said. "The motivation appeared to be disillusionment with machines and inanimate objects, and all expressed the desire of seeking fulfillment in helping people.

"This is an indication of the overwhelming shift in interest of the students who applied to medical schools this past year. Although more students than ever in the first-year class this fall have concentrated in biology, chemistry or the physical sciences, by far the majority indicate their major concern is with delivery of health care and not with the science of medicine.

"This social concern is the overwhelming motivation for entering the study of medicine."

THREE DEGREES AWARDED

Three MGH men have been awarded honorary degrees during the summer.

Dr. John H. Knowles, General Director, was given an Honorary Degree of Doctor of Laws by Northeastern University. Lewis L. Engel, Ph.D., received a similar degree from the University of Glasgow, Scotland. Dr. Thomas H. Ballantine was given an Honorary Degree of Doctor of Science by Suffolk University.

Dr. Henry K. Beecher, who earlier this year was awarded his third honorary doctorate, was elected an Honorary Fellow of the Royal Society of Medicine in England. Membership is limited to 100.

A Dire Threat, A Long Tear: A Patient in Need of

(Continued from Page 1)

hospital's Logan Airport Medical Station with a physical complaint.

In making a delivery to the airport, he had sliced open his wrist on the tail gate of the truck he drove. A nurse treated the wound. But alert, she noticed that the truck driver was unusually tense and nervous and perhaps in need of psychiatric help. Dr. Dwyer agreed to examine him.

What dramatized the case even more is the fact that this was Dr. Dwyer's first patient in a new use of the telediagnosis system.

The brainchild of Dr. Kenneth T. Bird, telediagnosis links the Logan Airport Medical Station to the MGH. An Associate Physician at MGH and Associate Clinical Professor of Medicine at Harvard Medical School, Dr. Bird directs both telediagnosis and the medical station.

Because of the physician shortage, doctors man the medical station only at peak hours. However, the two-way television hookup with its variety of telediagnostic equipment gives the nurse an instant backup of hospital physicians for serious cases she is unable to handle herself.

About 1,000 Patients

In the 15 months the system has been in operation, doctors have examined about 1,000 patients through telediagnosis.

Dr. Bird believes the system is now ready to expand. He envisions in the near future linking the MGH to a non-Boston hospital to provide the other institution with consultative service.

Most of that service would be psychiatric. Until last spring, though, MGH doctors have examined only medical patients over telediagnosis. And the only other known psychiatric uses of television – at Dartmouth Medical School and at Nebraska Neuropsychiatric Institute – differ in their approaches from the planned MGH program.

Dr. Thomas F. Dwyer at controls in telediagnosis room at MGH. Dr. Dwyer appears in mirror reflection of TV monitor on left, and a model representing patient at Logan Airport Medical Station appears in reflection of monitor on right.

Dr. Bird arranged with Dr. Leon Eisenberg, Chief of the Department of Psychiatry at the MGH, to test the feasibility of the idea.

Several months ago, Dr. John G. Clark, Chief of the Department's Acute Psychiatric Unit, began seeing patients over telediagnosis. Results looked promising.

About April, Dr. Dwyer, who for a number of years has been involved in teaching, interviewing skills and consultation techniques, began tentatively to use the system.

Some Qualms

"I had some qualms before the first interview," Dr. Dwyer said. "Like some of the psychiatrists I talked to about it, I had fears that the skills used in a face-to-face situation would not work on TV."

Experience indicated otherwise.

"Within five minutes of the first interview," Dr. Dwyer said, "I had the feeling I was in contact with the patient.

"All the patients responded to the same kinds of things they do when they are in my office."

The patient Dr. Dwyer has been interviewing most recently is a woman who harbors a strong distrust of psychiatrists.

"She was quick to pick up my smile," Dr. Dwyer said. "She would say, 'You are smiling at me because you think I'm crazy.' She and I were picking up cues from each other just as well as if we were in the same room."

Matter of Minutes

In a matter of minutes, Dr. Dwyer was able to overcome most of the woman's distrust. By the third interview, she was showing him photographs of her family via television.

One of Dr. Dwyer's chief initial concerns had been whether he could develop a doctor-patient relationship over TV. A series of incidents like the showing of family photographs has disabused the MGH Associate Psychiatrist of that worry. (Dr. Dwyer is also Harvard Medical School Assistant Clinical Professor of Psychiatry.)

"I feel no barrier at all to the development of a doctor-patient rela-

Help, and A Telediagnosis Interview To Provide It

tionship," he said. "This is so important because a good interview isn't possible without such a relationship. Even on a one-visit basis, when the psychiatrist is acting as a consultant, that is important."

Does Dr. Dwyer find the medium restricts the quality of the interviews in any way? "With these interviews," Dr. Dwyer said, "I can do anything that I *do* do in my office except shake the patient's hand.

"Apart from prescriptions and drugs, the psychiatrist works entirely verbally." And the telediagnosis system even enables Dr. Dwyer to write out the necessary prescription and have it appear simultaneously in the airport's telediagnosis room.

Simple Skills

He concedes that the psychiatrist has to acquire a few simple skills to take full advantage of telediagnosis. When the woman showed him family photographs, for example, he experienced difficulty in quickly focusing the remote-control camera at Logan.

A brief lesson from Dr. Bird, though, solved that problem. The rest, such as operation of the patient's camera at Logan by remote control, came swiftly with experience.

What about the mental patient's acceptance of television interviews? Among the first four patients this has varied widely.

One of the four, an alcoholic, never bothered to question the unusual nature of the interview. On the other hand, one woman was at first apprehensive "about being on TV." Dr. Dwyer quickly reassured her nobody but the psychiatrist could see or hear her.

The truck driver who threatened the shooting spree was even more suspicious of the medium.

TV Was Confidential

"It took longer to impress on him," Dr. Dwyer said, "that the TV was confidential."

From the first four patients, Dr. Dwyer draws some very early and admittedly uncertain conjectures.

"I think telediagnosis makes it easier for certain kinds of patients to talk to a psychiatrist who isn't in the same room.

"There is a fairly large group who need psychiatric help but never seek it, because they feel there is a stigma. Instead they go to a medical man bringing with them a mixture of physical and mental problems.

"I think this type of patient would accept the television interview more readily than an in-person one. For him, paradoxically, the television set erects a protective barrier that allows him to come in picture contact with the psychiatrist.

Too Uneasy

"I believe a smaller group of patients would insist on face-to-face contact in the same room or would be too uneasy about a person they were talking to over television and never get over that discomfort.

"Then there is a large group – probably the largest – who, I think, would accept TV as no more nor less than a regular interview."

On the basis of his preliminary study, Dr. Dwyer feels confident that the planned consultative service to a non-Boston hospital is practical.

In the more distant future, he also sees closed-circuit television as a boon to the continuing education of doctors. Like Dr. Bird, he envisions seminars held over television beamed into the office of physicians too busy to attend courses about advances in their fields. The same sets could provide the physician in a non-urban area with quick tele-consultation service for his patients.

Mrs. Martin S. Bander, secretary to Dr. John H. Knowles, General Director, looks over a three-day pile of letters and another of newspaper clippings on the subject of Dr. Knowles' non-appointment as Assistant Secretary for Health and Scientific Affairs in the Department of Health, Education and Welfare.

Dr. Knowles received hundreds of letters in the few days after Department Secretary Robert H. Finch withdrew at presidential request the MGH executive's name as his choice for the nation's top health post.

During the 5½ months after Secretary Finch first offered the post to Dr. Knowles, literally thousands of articles, editorials, and columns appeared on the subject in the nation's press, in addition to radio and television coverage.

Nearly all the editorials, columns and letters supported Dr. Knowles for the position.

Intensive Care Units, Part Four:

OUT OF THE WORST OF TIMES: "A BIG

(Continued from Page 1)

Miss Doris Hurley, RN, right, head nurse of non-intensive care wing, points out piece of equipment to Miss Gloria Edelhauser, RN, staff nurse. Pegboard on which equipment hangs was devised by nurses of Warren-Baker 12.

more classes in which the more experienced trained the newer ones.

"It was great that the experienced nurses could teach the newer ones," said Mrs. Marilyn Kerwin, RN, a nurse clinician. "It helped not only the new nurses but those who did the teaching.

"We attempted to emphasize the overall care of the patient, not just the EKG [electrocardiogram which records electrical impulses from the heart] or the equipment side of things. Each patient must be considered as an individual, as well as a set of signs and symptoms.

"Throughout, the doctors have been so supportive. They have encouraged us to be creative in teaching one another and in patient care. They bought books to start a library. The doctors and nurses put together money for a heart model for teaching nurses and patients."

Instruction to patients is an important part of the new unit's activities. Nurses and doctors are cooperating in preparing a booklet to help ready patients before they set a foot inside the hospital.

Once inside, the patient goes to a non-intensive care wing of Warren-Baker 12. Under Miss Doris Hurley, RN, nurses there instruct patients further in what to expect.

Sometimes nurses use the heart model to help the patient understand what his operation is all about.

The patient gets instruction on the proper breathing that will be required soon after regaining consciousness following the operation. He also learns what to expect immediately before and after surgery. Instruction is tailored to his individual needs.

"We try to help the patient focus his anxiety on surgery realistically," Mrs. Kerwin said. "We try to help him see which fears are realistic and which aren't. This is necessary because patients often have preconceived notions that need to be clarified."

The fact that the patient goes to a Recovery Room after the operation is an indication that the Cardiac Surgical Care Unit is not really an intensive care unit.

"Strictly speaking," Dr. Austen said, "it's more of a halfway house." The unit thus serves the patient between the critical period after surgery and the recuperative period in the adjoining wing of Warren-Baker 12.

A true intensive care unit usually has a central nursing station from which nurses can see most, if not all, of the patients. With 19 beds spread over a series of one and two-bed rooms, this clearly is not the case with the Cardiac Surgical Care Unit.

Nor is there one nurse for one patient. Nor is special monitoring equipment applied to every patient. Because the Recovery Room is the first stop after surgery, all these characteristics are not needed in the Cardiac Surgical Care Unit.

But special equipment of all kinds is at hand. And nurses skilled in its use are there to use it on those who do require it. What's more, the nurse-to-patient ratio is higher than in less specialized parts of the hospital.

The mere fact the patient occupies

Miss Margaret A. Ventre, RN, head nurse in Cardiac Surgical Care Unit, uses heart model to explain his own operation to Albert E. Burgess.

ADVANCE”

the same floor both before surgery and after the Recovery Room has proven a big help.

Of course, this juxtaposition makes it easy for the Cardiac Surgical Care nurses under Miss Margaret A. Ventre, RN, to orient patients both before surgery and before discharge. Another advantage accrues.

“Patients who are going to have open-heart surgery see those who have already gone through the same procedure,” said Dr. Allan L. Friedlich. An Assistant Clinical Professor of Medicine at Harvard Medical School, the MGH Physician is one of the heart specialists whose patients frequently occupy the unit. “Patient-to-patient conversation,” Dr. Friedlich said, “is often more effective even than a briefing from the physician or nurse.

“It is also true that by having the special unit the patients get out of the Recovery Room sooner than before.

“Then, too, the Cardiac Surgical Care Unit can act as a fireman for the other wing if an emergency arises on another portion of the floor. A number of patients have been resuscitated on the floor in both units, and one unit can back up the other.”

Another advantage of the new unit is that a resident working with the heart surgical team is available at all times.

“This makes the resident more effective and increases the safety of the patient because he can be more closely supervised,” Dr. Friedlich said.

At rounds the heart surgeons discuss each patient with the nursing staff, as well as administrative aspects of the case with the unit coordinator (non-nursing administrative officer for the unit). In this way, all members of the team share in planning each patient's care.

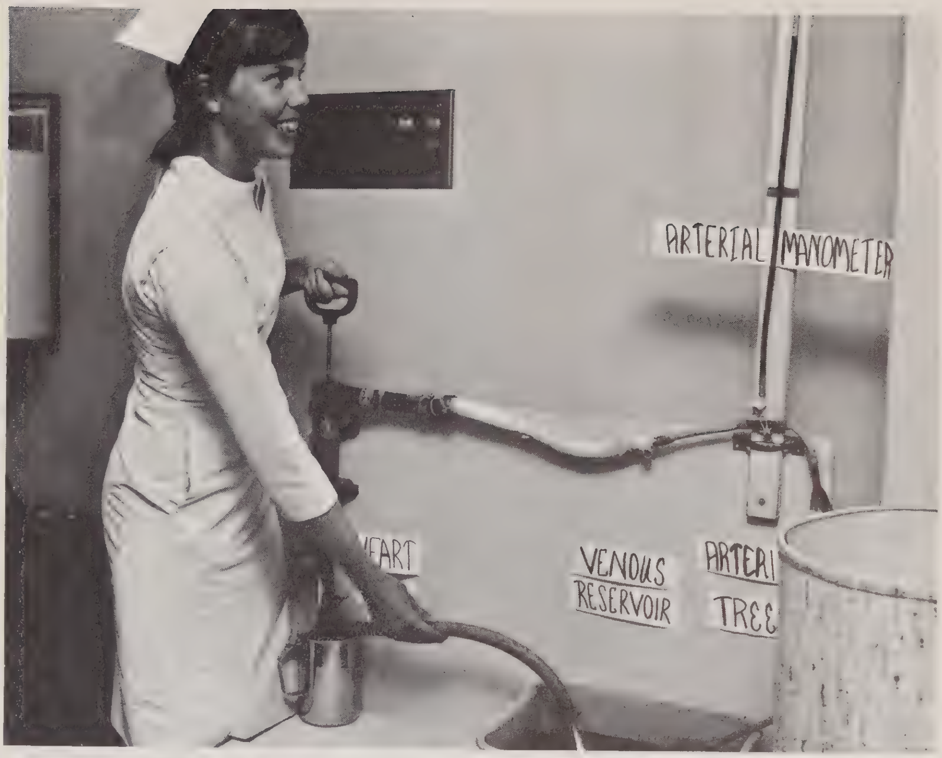
So specialized has the new unit become that it has evolved into a training area not only for MGH nurses but also for those from Northeastern University and from various other institutions.

“All this is a challenge to the bright nurse,” Dr. Friedlich said. “It makes her job more rewarding because the more competent you feel in doing your work, the more satisfaction it brings. This results in a high morale in a unit of this sort and an unusually strong sense of responsibility of the unit towards its patients. [In turn, job satisfaction has bolstered the recruitment of nurses.]

“There is a much freer give-and-take relationship between doctors and nurses in a unit of this kind. Nurses are much freer to point out impending problems or to make suggestions as to changes in patients' needs. The old idea of the doctor being the master and the nurse being the slave has long since departed.

“For all these reasons, the unit has been a big advance that has made a great difference in the safety and effectiveness of the cardiac-surgery program.”

(*Series to be Continued*)



Mrs. Marilyn Kerwin, RN, demonstrates ingenious teaching device she improvised.

From Bailing Out Boats To Teaching Nurses

An old bilge pump that once bailed water from a boat is now bailing out nursing instructors.

The device with its ingenious modifications is the brainchild of Mrs. Marilyn Kerwin, RN. A nurse clinician, Mrs. Kerwin is one of those who teach nurses in the MGH's Cardiac Surgical Unit.

“I found it difficult before,” she said, “to explain the different ways that the heart alters the output of blood.”

Searching for a way to show this graphically, Mrs. Kerwin confiscated the pump from her husband's boat. She simulated the action of a heart valve by implanting in the pump an artificial valve (Starr-Edwards) like that used to replace a patient's defective one.

Mrs. Kerwin added a few other touches like an aortic graft to illustrate the need for an expandible aorta (the main artery leading from the heart). For blood, she used water that she dyed red.

Now Mrs. Kerwin can demonstrate to nurses what happens when the pump works faster or slower, or when the blood pressure goes up or down. She points out how the heart's valves function.

“Once nurses understand the normal heart mechanism,” Mrs. Kerwin said, “it is easier for them to understand what happens in the sick heart and the nursing implication involved.”

After *seeing* what goes on in the heart–blood-vessel system (cardiovascular), the nurse no longer thinks of pulse and blood pressure as vague statistics, but as related factors needed to evaluate and predict the care required for the patient.

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SO. AFRICAN REPORT

Transplantation: A Matter of National Pride

South Africa, where the heart transplant was born nearly two years ago, is apparently striving for preeminence in other kinds of organ grafts as well.

Dr. Paul S. Russell, Director of Transplants at MGH, has seen plans for an expensive Institute for Research to be built at Cape Town's Groote Schuur Hospital. Funded by diamond magnate Harry Oppenheimer, the Institute will study transplant research exclusively.

Plans call for construction to begin soon with completion in 1½ years.

On a recent trip to South Africa, Dr. Russell saw a new transplant wing of the Groote Schurr Hospital already rising. The wing will treat heart, kidney and liver transplant patients.

A far cry from the converted outpatient department where the first heart-graft patients were cared for, the new wing will have elaborate isolation procedures. Some of the ideas for these came from suggestions made to the Cape Town team nearly a year ago at the MGH.

"They are very concerned by the susceptibility of transplant patients to infections," Dr. Russell said.

The Cape Town group is doing a lot of research work on the liver. Unlike kidney patients who can be kept alive on machines (dialysis) which do the sick kidney's job of purifying the blood, liver patients have no such device available to them. Dialysis can keep a person with kidney disease alive until a suitable transplant donor can be found.

Blood of Baboons

At Cape Town, scientists are experimenting with a technique that has been tried at the University of Virginia. The Cape Town researchers are replacing the blood of baboons with human blood.

They then connect a baboon to a patient with liver disease and cross-transfuse the blood between the animal and the human. The theory is that this procedure will buy time for the liver to regenerate itself or at least keep the patient alive until a suitable donor can be found for a transplant.

This technique is a more elaborate variant of experiments at Boston City Hospital in which the isolated liver of a pig was used to perfuse the patient.

In one case, the Groote Schuur group has kept a patient with a severe liver inflammation (fulminating hepatitis) alive for one month. The patient then died of another cause.

"This is the only approach at the moment to an artificial liver," Dr. Russell said.

Liver Transplant

At Johannesburg, South Africa, Dr. Russell talked to physicians who have kept a baboon liver transplant healthy for 120 days. They treated the baboon solely with antilymphocyte serum (ALS). A substance used to fool the body into accepting a transplant, ALS is a scientific advance to which the MGH has made a major contribution.

The Johannesburg scientists were highly interested in the latest techniques being used at this hospital for purifying ALS.

Dr. Russell was invited to South Africa to attend the South African Medical Congress in the capital, Pretoria. He said that the emphasis on transplantation appears to be a matter of national pride.

Large number of baboons are a boon to transplant research in South Africa. Taxi ride was snapped by Dr. Paul S. Russell over the hood of his car.

With this issue the circulation of the *MGH News* increases from 7,000 to about 40,000. At the same time, the expanded list of subscribers is being computerized. The operation is a complicated one and undoubtedly mistakes will be made in the initial months. Your patience and understanding are appreciated.

MGH News

Vol. 28 No. 8 MASSACHUSETTS GENERAL HOSPITAL, BOSTON, MASSACHUSETTS October, 1969

In the Offing: New Tests for Academic Success?

John has an IQ of 170, but is flunking out of high school. Peter's IQ is 102, but he gets all A's.

Obviously, things other than intelligence influence academic success. Gene M. Smith, Ph.D., an MGH psychologist, is developing tests for these other factors, and since studies begun with nurses in 1960, he has been applying them to a wide range of students.

"In combination with measures of intelligence," he said, "these tests increase substantially our ability to predict academic success, that is, grades in school."

Said Dr. Smith, who holds appointments as Psychologist in the Departments of Anesthesia and Psychiatry at the MGH and is Assistant Professor of Psychology at Harvard Medical School:

"The results show that students who make maximum use of their intellectual ability are the ones who score highest on our measures of responsibility, dependability, self-reliance, resourcefulness, conscientiousness, persistence, desire to learn, determination to succeed, and other allied traits. These traits – combined with confidence in one's ability to learn and the belief that one's effort will be rewarded – help distinguish the academic winners from the academic losers, and they add importantly to the information provided by more traditional predictors of success such as College Board scores and IQ tests.

"Most tests currently used for admissions purposes by nursing schools, medical schools, colleges, etc., do not take such traits into account. By broadening

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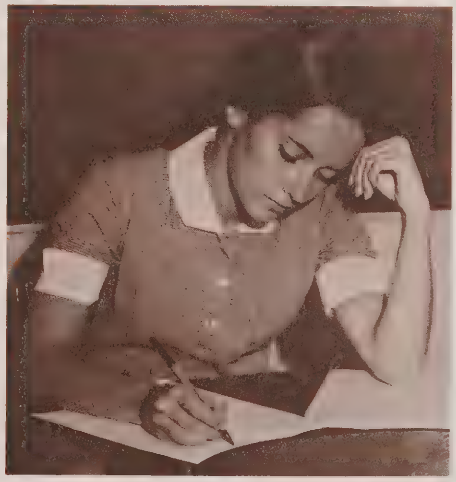

New tests may "increase substantially" ability to predict academic success.

Tiny Molecules – A Question of Consciousness

The action of tiny molecules may hold the key to a greater understanding of what consciousness is.

Molecular level interaction of anesthetics with tissues (receptors) is of particular interest to the MGH's new Chief of Anesthesia, Dr. Richard J. Kitz.

Dr. Kitz, who has also been appointed Professor of Anesthesia at Harvard Medical School, said:

"We really don't know what anesthesia is – that is, its actions on the molecular level which make it work are not understood."

Dr. Kitz feels that the nature of the anesthetic state is closely linked to the question, "What is consciousness?"

"When one begins examining what consciousness is, and therefore life, the discussion can become very philosophical. I find it fascinating."

Investigation into molecular level effects of anesthesia will be a part of the department's basic scientific research.

"Understanding the mechanism may help to develop agents to better accomplish the anesthetic care of sick patients," Dr. Kitz said.

The drugs now used take away consciousness, Dr. Kitz pointed out, but also unnecessarily depress other functions. Research may result in the development of drugs that affect only the functions necessary to allow a patient to undergo surgery.

"Most people think of the anesthesiologist in conjunction with going to sleep and with the operating room," Dr. Kitz said, "but the field of expertise is greater, and these specialists can contribute much outside the operating room."

At the MGH, anesthesia has the responsibility for the Respiratory Therapy Division, Respiratory Unit, Inhalation Therapy Section, Chest Physical Therapy Service and Blood-Gas Unit. However, extension of the anesthesiologist's expertise to the fields of toxicology (the science of poisons) and clinical pharmacology (the science dealing with drugs) has yet to evolve.

"Anesthesiologists are really toxicologists. They use drugs to 'intoxicate' people which is more than just 'putting them to sleep.' Respiration is depressed and motion stilled in order to provide

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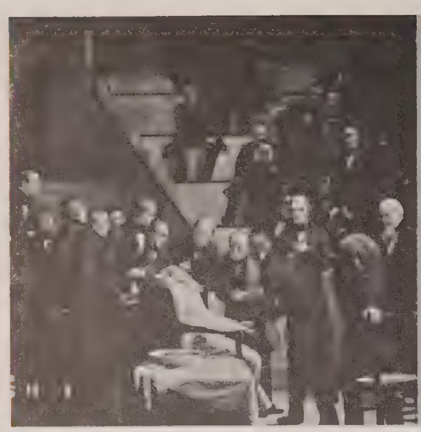

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EDITORIAL:

A Leaky System, An Attempt To Seal It

Tests measuring intelligence have always involved a certain amount of controversy. More recently, controversy became uproar when Prof. Arthur R. Jensen of the University of California resurrected, in a way interpreted by many as racist, the old arguments about heredity vs. environment.

One side issue relates to the importance of IQ tests. They were originally thought to measure potential for academic success. But psychologists – indeed the public at large – have realized that intelligence as measured by the IQ test is no guarantee of such success.

An article on page 1 of this issue describes tests an MGH psychologist is developing to measure certain traits which influence academic potential.

However, one very large area of uncertainty about the new approach remains. Can a student "beat" the test by guessing at the "proper" answers? The answer to that question will remain a mystery at least until follow-up comparisons are made next year. Even if the new test passes, one may still wonder why it would surpass the combination of IQ and the student's academic record which should itself be some measure of the application of those very traits the new procedure seeks to evaluate.

Two thoughts come to mind. First, about to face the unknown void beyond graduation, many high school seniors suddenly buckle down to study all too late to cancel their previous record. Aimed at uncovering their present attitudes, the new tests therefore seek to plow an often more significant field. Secondly, high school records by themselves fail to take into account that an A in Upper Slobovia High School might equal a C– in Newton High.

One fact, however, remains clear. Each year, thousands of students drop out of educational institutions. For a variety of reasons, the failure of each one to complete his instruction costs the institution hundreds of dollars and makes sub-optimal use of its instructors, in many cases already in short supply.

Multiplied the country over, the situation results in a waste of millions of dollars and a loss of thousands of teaching hours. What hurts even more is that students destined to fail usurp the classroom space from others with a potential for success.

Often those with a success potential are denied entry to the classroom because present means of evaluating candidates remain woefully inept. If the new test can plug even one hole in the leaky system, the benefits will redound to our educational systems and our society.

Letters to the Editor

Dear Editor:

On my desk is the March '69 edition of the *MGH News,* and until now I didn't have the courage to write and ask. On the front page of that issue is a report that the Medical Service is leaving the Bulfinch. What is happening to the Bulfinch itself? Will it be torn down or will it remain as a monument and museum?

JUDITH RONAT, M.D.
(Clinical Fellow at MGH,
63-64; Resident
at McLean, 61-63)

(*Editor's Note:* When the Medical Service moves to the as yet unfinished floors of the Gray Building, the historic Bulfinch Building will not vanish.

Designed by famed architect Charles Bulfinch and built in 1821 as the first MGH, the structure houses a national historic shrine, the Ether Dome.

This month marks the 123rd anniversary of the first public demonstration of the use of ether in surgical operation, from which the room received its name. The painting by Robert Hinckley on this page pictures the scene on Oct. 16, 1846.

Although the amphitheater has not been used as an operating room since 1867, it is still very much a part of the hospital's daily life, utilized for medical rounds and conferences.

The rest of Bulfinch will also continue to serve, possibly for rehabilitation, physical medicine; psychiatry; a library, or a combination of these. The final allocation of the space is not yet determined.)

The *MGH News* welcomes letters from its readers. To avoid condensation, letters should be brief and must be signed. Names will be withheld on request.

With its September issue the circulation of the *MGH News* increased from 7,000 to about 40,000. The expanded list of subscribers is being computerized. The operation is a complicated one and undoubtedly mistakes will be made in the initial months. Your patience and understanding are appreciated.

INTENSIVE CARE UNITS, PART 5

About To Open: A New MGH Surgical Unit

The MGH will open by Nov. 1 a 12-bed intensive care unit for surgical patients.

Situated in the new Gray Building, it will at first admit the immediate postoperative cardiac surgical patients. As more beds are opened, other surgical patients requiring intensive care will be admitted.

With the full use later this year of both the Surgical Intensive Care Unit and the adjoining 12-bed Respiratory Care Unit (June-August *MGH News*), the MGH bed capacity will jump from its present 1,066 to 1,090.

In design, the Surgical Intensive Care Unit is the mirror image of the Respiratory Care Unit but initially will have more detailed monitoring equipment.

Central Station Alarm

"We will be able to monitor quite an array of physiologic data," said Dr. Eldred D. Mundth, Director of the Surgical Intensive Care Unit. "We will have a central station alarm similar to that of the Coronary Care Unit."

Physicians will be able to set the alarm to go off automatically if serious changes occur in the patient's condition.

Nurses will be able to monitor on screens at the nursing station all sorts of aspects of the patient's condition.

Besides routine monitoring, the system will allow doctors to keep a constant check on such details as the blood pressure in various heart chambers.

All this monitoring will be connected to a hospital computer project called MEDLAB that will permit constant analysis of physiologic data. This project will be made possible under a United States Public Health Service grant.

Helpful Capability

"Having such a monitoring capability," Dr. Mundth said, "is most helpful in critically ill patients. Nurses will be trained to interpret the data so that they can call a doctor when necessary."

Registered nurses, licensed practical nurses and nursing assistants will team to provide nursing care.

Surgical residents will cover the unit 24 hours a day on a rotational basis. As director, Dr. Mundth will serve the unit on a part-time administrative and consultative basis.

The new unit is expected to relieve pressures placed on other areas of the hospital.

"Until now," Dr. Mundth said, "the south wings of the general ward surgical services have acted somewhat in a capacity of intensive care by necessity and the recovery room has been used for that purpose. This has placed a great burden on the recovery room, both in numbers of patients crowded in and in personnel.

Difficult Combination

"It is difficult for recovery room personnel to take care of routine postoperative cases when they also have to take care of intensive care patients.

"This burden was especially great because of the presence of open-heart surgical patients who require special care."

When fully operative, the new unit will provide the initial postoperative care for open-heart surgical patients. From there they will go to the Cardiac Surgical Care Unit on Warren-Baker 12 (September *MGH News*).

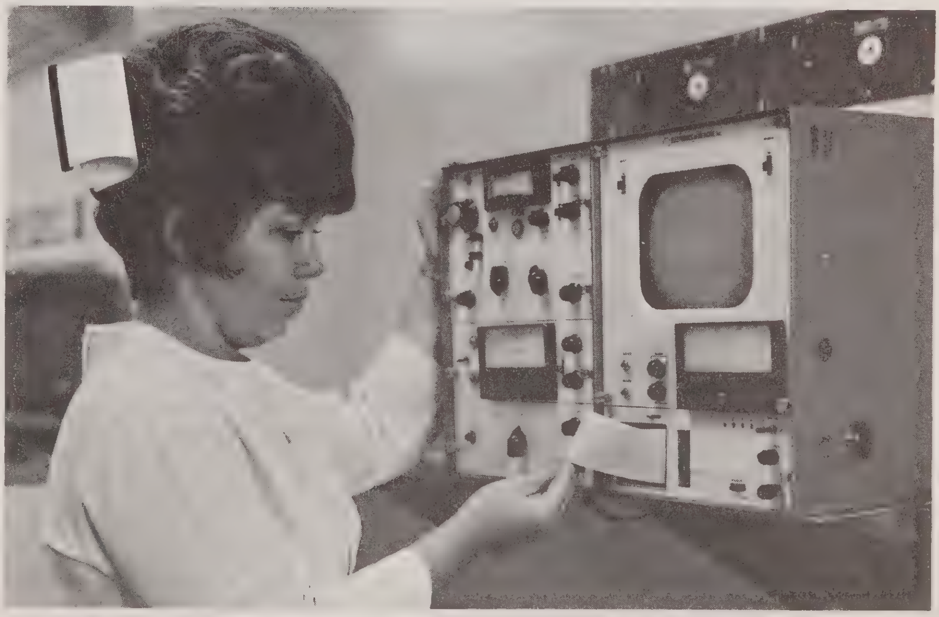
Multiple Injuries

Besides getting all open-heart patients, the Surgical Intensive Care Unit will treat some pediatric, neurosurgical, orthopedic, urologic and general surgical cases.

"Patients won't need to have had an operation first to qualify," Dr. Mundth said. "Multiple injuries from a serious automobile accident might require the services of the unit.

"Such patients often have a question of a ruptured spleen or liver injury. They may have a chest injury and require a respirator. Perhaps they have multiple broken bones. All such problems can benefit from the specialized intensive care our unit will provide."

(Series to be Continued)



Leslie Skirm, RN, examines a tape from a monitor in the new Surgical Intensive Care Unit.

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IQ + New Tests May = A Valuable

(Continued from Page 1)

the concept of academic potential to include them, we can more accurately predict academic performance.

"Presently, many applicants to programs of various types are accepted and then fail. Many others, who would succeed if accepted, are rejected. Further refinement and implementation of the methods we have evolved could reduce both sources of loss. Our national educational resources are not unlimited, and any procedure which increases the efficiency of their use has practical importance.

"With the current critical shortage of nurses, doctors, and others involved in the delivery of health care, it is vitally important that we improve our methods of selecting applicants to the various health care programs."

Dr. Smith and the members of his research team think the procedures they have used in the study of nursing students can be adapted for use with students in other types of medical and allied medical educational programs. They hope to look into that possibility in a study soon to be conducted with the residents in anesthesia at the MGH and other Harvard teaching hospitals.

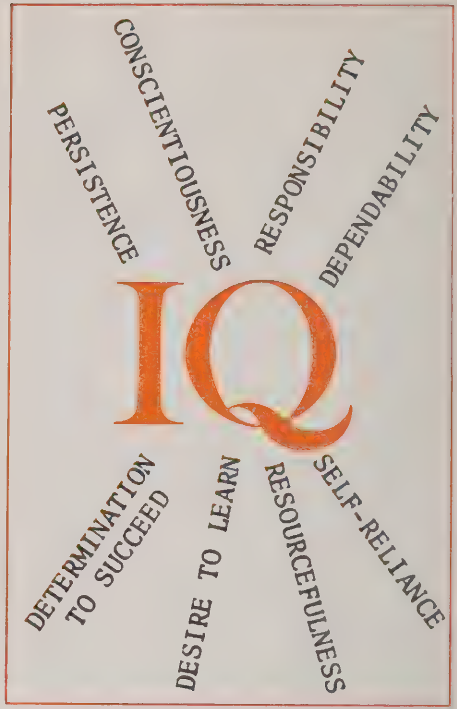
"When we began our first studies of student nurses in 1960," Dr. Smith said, "we had no idea that the work would carry us into related studies of students in college, high school, junior high school, and elementary school, but that has happened.

"What we have learned in studies of our non-nursing samples has given rise to two new investigations which extend the work still further. One is a study of academic potential among students from developing countries in Latin America. The other is a study of academic potential among underprivileged students in our own country."

Variety of Sources

Support for the studies of academic potential has come from a variety of sources including the National Institutes of Health, the Spaulding-Potter Charitable Trusts, the Council for Tobacco Research, U.S.A., and the American Cancer Society.

The first phase of the study began in 1960 at the MGH School of Nursing and at the Catherine Laboure School of Nursing in Dorchester. Later, students from 10 other schools of nursing in Greater Boston were included.



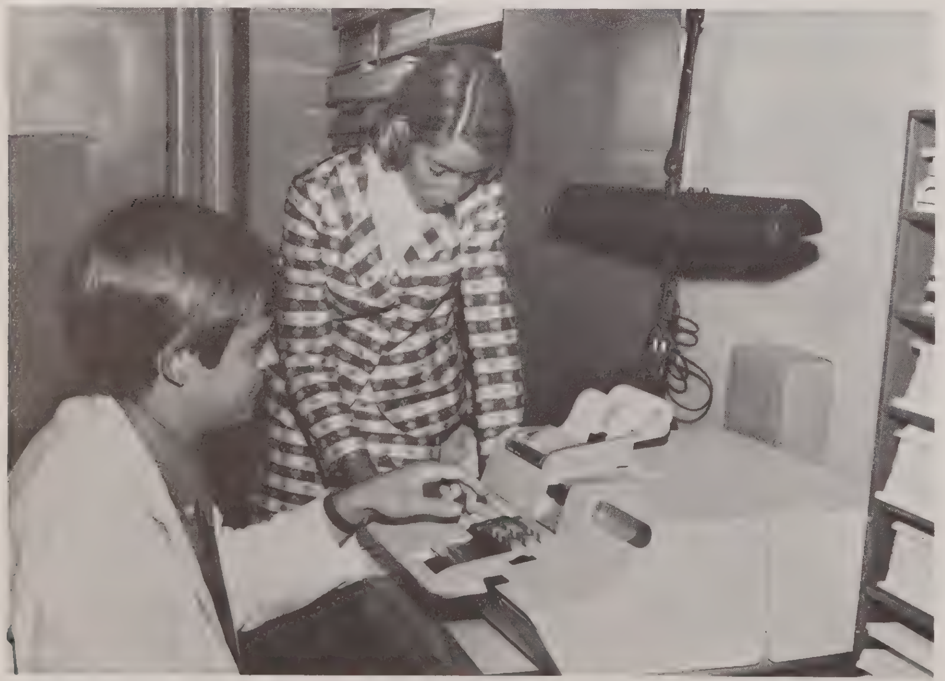
"In the various samples of student nurses studied by our research team," Dr. Smith said, "we found essentially the same aspects of personality and motivation to be associated with academic performance.

"During the past two years our work has been extended to include studies of 12,000 students from grades 4-12 in Greater Boston and a sample of 1,000 Spanish-speaking students from San Juan, Puerto Rico. Although the results vary somewhat from sample to sample, a surprising degree of uniformity has emerged, even though the samples differ concerning important factors such as age, socio-economic background, culture, and even the language spoken."

Two Procedures

The research team has used two quite different procedures to assess personality. One obtains information by asking the student to respond to a questionnaire; the other by asking the student's classmates to rate him on particular aspects of personality. The two procedures are complementary. Each has virtues which make it superior to the other for certain purposes.

"In a recent study of 211 students in the Massachusetts General Hospital School of Nursing," Dr. Smith said, explaining the self-report questionnaire, "we found that grade point average in nursing school could be predicted from a knowledge of high school perform-



Dwight Boyd and Dianne Ullian, members of research team of Gene M. Smith, Ph.D., go over figures used in new test.

v Tool to Predict Academic Success

ance and College Board scores with only moderate success.

"When scores from our questionnaire were added to those conventional predictors, the accuracy of predicting grade point average in nursing school increased more than 2½ times. Similar results have been obtained at the other nursing schools we have studied.

"When these same students were retested under instruction to try to 'beat' the test by guessing the 'proper' answers, the questionnaire scores still increased predictability of grade point average to a degree that was statistically significant and of practical importance."

MGH School of Nursing is involved in final practical trial of new tests that were devised to supplement measures of IQ.

Practical Trial

Now the questionnaire is being put to a final practical trial. Members of incoming classes at three nursing schools were selected on the basis of their scores on the new questionnaire, as well as their standing on traditional admissions criteria. The participating institutions are the MGH, Catherine Laboure and New England Deaconess.

"The ultimate test of the practical value of the questionnaire for selection of student nurses," Dr. Smith said, "will come early next year when we examine the correlation between academic performance of the new freshmen and their personality scores obtained when they were high school seniors applying for admission to nursing school.

"Those students took the questionnaire with the expectation that their answers would influence their chance for admission. If the questionnaire retains predictive usefulness under those conditions, it has practical value for selection purposes."

Gene M. Smith, Ph.D.

Dr. Smith presented a paper on his studies of academic potential at the 1969 convention of the American Psychological Association in September. Earlier this year, he described his approach at the Inter-American Congress of Psychology in Montevideo, Uruguay.

Very Enthusiastic

He found the Latin American psychologists very enthusiastic about the work. They recognized the potential usefulness of his procedures for helping educators in the developing countries to recognize academic talent – thereby enabling them to direct their limited resources in a more efficient way. Several of these psychologists agreed to apply his procedures in their respective countries.

During August of this year, 2,000 students in La Paz, Bolivia, were tested with a Spanish translation of the questionnaire. At the present time, a Portuguese translation is being administered to 2,000 students in Rio de Janeiro, Brazil.

Three other psychologists in Latin America have similarly agreed to use his tests, but the work has not yet begun. Dr. Smith does not expect to know for several more months whether the questionnaires predict academic performance in the new Latin American samples.

Although the work is still in the planning stages, he hopes to include samples from the ghetto areas of Boston: "It is most important that we improve our ability to recognize talent among underprivileged Americans who, despite poor performance with regard to conventional yardsticks, will succeed in college if given the chance.

Limited Openings

"There is a limited number of openings that can be made available. To the extent that we can refine our selection procedures, we can improve the use of our educational resources.

"The urgent need for providing opportunities for underprivileged Americans has led nursing schools, medical schools, and colleges throughout the country to accept students who do not meet the usual standards for admission – in the hope that a worthwhile percentage of them will succeed despite their marginal academic status.

"However, the mechanism by which some underprivileged students are accepted, and others are rejected, is far from perfect. By extending our studies to include students from the ghetto areas, we hope to obtain information to improve that mechanism so that it will become possible to accept students who appear to be marginal but who, in fact, are not.

"They are not marginal because their personal strengths will enable them to perform satisfactorily despite previous cultural and educational deprivation."

New Urology Chief to Expand Basic Research

A "continuation of the excellent care patients receive on the Urology Service and expansion of its research efforts" are main goals of Dr. George R. Prout, new Chief of the Urology Service at MGH.

Also appointed Professor of Surgery at Harvard Medical School, he succeeds as Chief of Urology Dr. Wyland Fenway Leadbetter who will continue as Clinical Professor of Surgery at Harvard. Dr. Leadbetter had been Chief of the department since 1955.

"The Urology Service under Dr. Leadbetter has acquired a reputation that places it at the apex of urology training," Dr. Prout said. "Dr. Leadbetter put it there. His contribution to the MGH, Harvard and American medicine is outstanding.

"When a unit is so outstanding, you don't change it appreciably – you just put a little grease on the axle if that's what it needs."

Dr. Prout is planning to add some grease by expanding the basic laboratory effort of the service. Study will be done in conjunction with Dr. James J. Daly of the Department of Pathology.

"We will develop lines of basic research related to the very real problems of patients," Dr. Prout said.

Dr. Prout is involved in much clinical research, but he underlined the importance of basic scientific research as a major building block in a superior training program. He intends to provide an opportunity for men who go through the clinical program to learn basic scientific research in the Service's laboratories.

To do this, Dr. Prout plans to attract men who are skilled in and have elected to devote their careers to laboratory research.

"Such a program," Dr. Prout said, "based on both excellent clinical and basic science training, will provide men with the experience necessary to enter academic urology."

His own major research interest lies in tumor and organ immunology. Immunology is the specialty that, for example, delves into what causes the body to reject a transplanted organ.

He and his associates have made intensive studies of the protein structure of the prostate gland and its antigenic characteristics. Antigens are found in organs and tissues. These substances are capable of producing a reaction in other members of the same species or in other species. It is, in a sense, a reaction (rejection) that a kidney transplant patient shows against his new kidney.

One of the long-term goals is to develop an antiserum (a serum that contains antibodies) that will seek out only prostatic cells, either cancerous or noncancerous. The gamma globulin (a common antibody) in such serum might then be tagged with radioactive particles or an anticancer drug.

Currently, they are developing an immunological test for measuring acid phosphatase, an enzyme (substance that speeds chemical reactions) found in excessive amounts in the blood of patients with prostatic cancer. Such a test will provide a very sensitive means of measuring the vigor of tumor growth and the effect anticancer drugs may have on this growth, thus improving both the diagnosis and treatment of such patients.

Dr. George Prout discusses a patient X ray with Dr. Warren Koontz. "Continued excellence of patient care," as well as emphasis on research and education, will be an important aspect of the Urology Department under the new leadership of Dr. Prout.

Dr. Prout is chairman of a National Cancer Institute-sponsored group of urologists who are studying the effects of drug therapy, principally the drug 5-FU, and irradiation on cancers of the genitourinary organs. He also serves on a five-man advisory genitourinary task force for the National Cancer Institute and is a member of the Institute's Committee on Clinical Cancer Training. In addition, he is a member of the Commission on Cancer of the American College of Surgeons.

Coming here from Richmond, Va., Dr. Prout served as Professor and Chairman of the Department of Urology at the Medical College of Virginia.

Boston born, he received his M.D. from Albany Medical College. He became interested in urology during his first year of surgical training.

"I felt the need for specialization because I couldn't satisfy myself that I could reach and maintain a level of competence in all the areas that surgery encompasses.

"So I selected the specialty that provides for a very high rate of exact preoperative diagnoses and, most important, incorporates surgical procedures that have fine results. Thus, one usually sees the patient completely recovered and able to return to a useful role in society.

"In addition, urology offered great opportunity in either academic medicine, practice, or a combination of these."

Following a two-year duty as a surgeon with the Navy in Korea, he gained his urological training at the New York Hospital-Cornell Medical Center, with a year out as a fellow at the Memorial Center for Cancer and Allied Diseases. After completing his residency at the New York Hospital in 1956, he was appointed to Memorial's attending staff.

Dr. Prout brought Dr. Warren Koontz with him from Virginia, where they had been working together for the past three years. Dr. Koontz will be involved mainly in undergraduate and postgraduate training, serving as Assistant Professor of Surgery at Harvard Medical School and Assistant Urologist here at MGH.

Dr. Koontz received his M.D. degree from the Medical School of the University of Virginia, and spent his internship, surgical residency and urological training at New York Hospital-Cornell Medical Center where he met Dr. Prout.

Better Understanding of Consciousness

(Continued from Page 1)

surgeons the opportunity to do their job. They are experts in the use of drugs, their side effects and antidotes, because they use them daily.

"Therefore, an anesthesiologist should be an important member of the team approach to the care of the drugged patient," Dr. Kitz said. He feels that perhaps anesthesiologists are not consulted in all the cases to which they are able to contribute because there are so few in the specialty. Their operating room activities now require most of their time.

As a physician-scientist-teacher, Dr. Kitz replaces internationally renowned anesthesiologist Dr. Henry K. Beecher. Dr. Beecher, Henry Isaiah Dorr Professor of Research in Anesthesia at Harvard, has begun a year's leave of absence from the MGH and will retire in 1970 after 34 years as Chief of Anesthesia.

Dr. Kitz plans to reevaluate the department's multi-phased activities: its role inside and outside the operating room, its responsibilities for education, research, relations with other departments and the medical school. "This close look," he said, "will identify the areas of the department that are traditionally excellent, so they may be underscored and supported, and isolate those areas that need strengthening."

He intends to work closely with the other departments of the hospital and medical school to help develop the programs necessary for superior patient care. Cooperation is one of his main goals.

Dr. Kitz said the department will also examine its relationship to the anesthesia community outside the hospital. "The MGH is a leader in anesthesia. This role demands a very clear crystal ball. We must attempt to predict future needs of anesthesia at the community and national levels."

One of the most critical needs nationally involves the manpower shortage.

"At current rates of training new anesthesiologists, it is impossible to keep up with the health care needs of the burgeoning population of the country. Even if the population increase levels off, it would take 30 to 40 years to train enough anesthesiologists to catch up with the demands." Nurse anesthetists are used to complement doctors, but there is also an acute nursing shortage.

The resident teaching program of Anesthesia will be restructured under Dr. Kitz's leadership. Here he helps chief resident, Dr. Burton A. Briggs (on the left), prepare a patient for an operation.

Dr. Kitz feels a solution to the problem would be to create a new job structure in anesthesia – a physician's assistant, skilled in certain technical aspects of medical care.

This specialist would provide an extension of a physician's patient care activities. No such program in anesthesiology currently exists in this country, although several pilot projects are being formed.

Dr. Kitz is considering the possibility of a physician's assistant training program in which a student would spend additional time after training as an inhalation therapist. This program might, Dr. Kitz suggested, dovetail into a two-year college course as work toward a four-year degree.

The anesthesia residents' education program will also be restructured under Dr. Kitz. It will be transformed from a series of lectures on various facets of the department "with no ready relationship," to a "subject-oriented block approach."

One general subject, for instance, ventilation (the constant supply of gases through the lungs), will provide an overall structure for one month's lectures. The entire spectrum of this topic will be considered from basic fundamentals to clinical application. Dr. Kitz plans to supplement his staff with additional experts from the MGH, Harvard, and other universities.

During the three years of usual clinical residency, all areas relevant to anesthesia will be considered.

Before coming here, Dr. Kitz had been Associate Professor of Anesthesiology at Columbia University College of Physicians and Surgeons and Associate Attending Anesthesiologist at Presbyterian Hospital, New York.

It was at that hospital that he interned in surgery and served his residency in surgery and anesthesia, after receiving his B.S. and M.D. from Marquette University in Wisconsin. In 1961-62 he was a National Institutes of Health Special Fellow in the Department of Biochemistry at Columbia University. He was Visiting Scientist, Department of Toxicology, Karolinska Institutet, Stockholm, Sweden, for the year 1968.

He is currently Chairman of the Committee on Pharmacology and Neuromuscular Transmission, Scientific Council, American Society of Anesthesiologists, and a member of numerous other national councils, societies and organizations.

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Times and Medicine Change – So Does Mortality

From the War of 1812 to the conflict in Vietnam, from the invention of the steamboat to the landing on the moon, from the introduction of smallpox vaccination in this country to the first heart transplant – times and medicine have changed considerably. So have the main causes of death.

The contrast between contemporary statistics on deaths for Boston and bills of mortality (compilations of data on deaths) from 150 years ago illuminates the difference.

The abstract of the bill of mortality for 1813 reproduced here was sent to William Phillips, the first president of the two-year-old Massachusetts General Hospital Corporation, eight years before the hospital had a building.

Only three years earlier, in 1810, the Town of Boston had empowered its Board of Health to supervise burials because cemeteries were considered potentially pestilent. With this duty, the Board gained the means, unavailable before, to compile statistics on deaths and their causes. The information was not as complete as medical historians might wish; the cause of death was not correlated with age or month of death, and a standard system of classification was missing.

The state of medical knowledge and the absence of a requirement for physicians to report causes of death often made it necessary to rely on relatives of the deceased for that information. Thus, some of the causes listed in these early bills, such as "white swelling," "drinking cold water," "mortification," and "old age," are somewhat less than scientific.

A striking feature of the old data is the high mortality due to "infantile diseases." Not enough was known about these fatal disorders to differentiate, prevent or cure them. Nineteen percent of the deaths for 1813 were for the age group under one year old, and 35 percent were under 5 years old. In 1966, the same under-five category accounted for four percent of the Boston total.

About another third of the 1813 deaths were for the ages 20-50 years. In contrast, during 1966, deaths of those 60 years and older accounted for about 74 percent of the total.

Were conditions similar now to what they were 150 years ago, we would be entering one of the most unhealthy periods of the year. Early fall was a time of high mortality for both infants and young adults. For the latter, the danger resulted largely from typhoid fever and intestinal diseases.

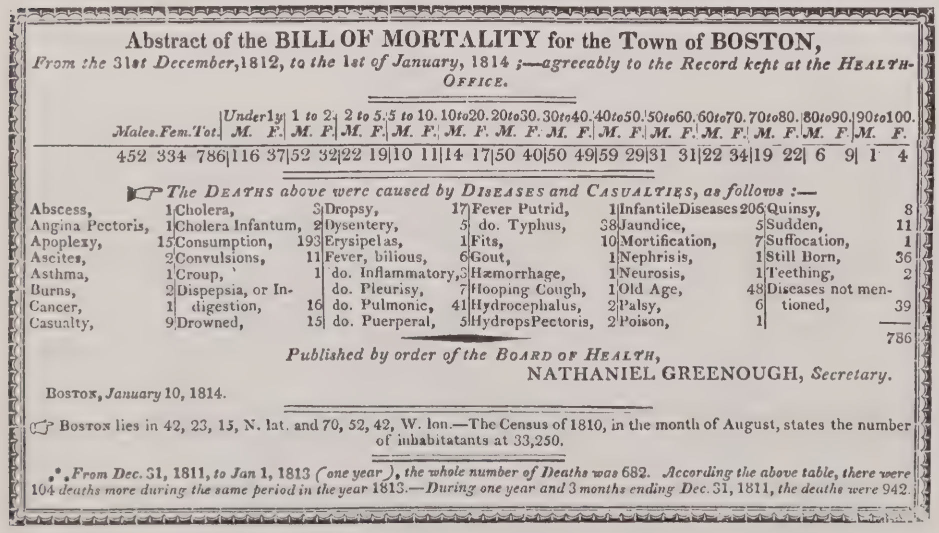
Another peak of illness was caused by respiratory diseases, especially pneumonia, during the spring. The greatest killer of young adults, tuberculosis, spread its destruction throughout the year. In 1813, 24 percent of the deaths were from "consumption." In 1966, tuberculosis caused less than one percent of deaths.

The high mortality rate for these diseases was partially due to the inability of medical men of that time to treat them successfully.

For instance, few American physicians considered tuberculosis contagious, so that the diseased and the well had unrestricted contact. The general standard of living in Boston also had much to do with the incidence of tuberculosis and pneumonia, and the lack of sanitation goes far to explain the prevalence of other diseases. Then too, antibiotics did not exist to fight bacteria.

Medicine has progressed a good deal from that era more than a century and a half ago.

However, the profession cannot claim credit for stamping out one cause of death listed in the 1819 bill of mortality abstract found in the MGH archives. That year, one of Boston's citizens lost his life in a duel.



Abstract of the BILL OF MORTALITY for the Town of BOSTON,
From the 31st December, 1812, to the 1st of January, 1814 ;—agreeably to the Record kept at the HEALTH-OFFICE.

Males.	*Fem.*	*Tot.*	Under 1 y		1 to 2.		2 to 5.		5 to 10.		10 to 20.		20 to 30.		30 to 40.		40 to 50.		50 to 60.		60 to 70.		70 to 80.		80 to 90.		90 to 100.	
			M.	*F.*	*M.*	*F.*	*M.*	*F.*	*M.*	*F.*	*M.*	*F.*	*M.*	*F.*	*M.*	*F.*	*M.*	*F.*	*M.*	*F.*	*M.*	*F.*	*M.*	*F.*	*M.*	*F.*	*M.*	*F.*
452	334	786	116	37	52	32	22	19	10	11	14	17	50	40	50	49	59	29	31	31	22	34	19	22	6	9	1	4

☞ *The DEATHS above were caused by DISEASES and CASUALTIES, as follows :—*

Abscess,	1	Cholera,	3	Dropsy,	17	Fever Putrid,	1	Infantile Diseases	206	Quinsy,	8
Angina Pectoris,	1	Cholera Infantum,	2	Dysentery,	5	do. Typhus,	38	Jaundice,	5	Sudden,	11
Apoplexy,	15	Consumption,	193	Erysipelas,	1	Fits,	10	Mortification,	7	Suffocation,	1
Ascites,	2	Convulsions,	11	Fever, bilious,	6	Gout,	1	Nephrisis,	1	Still Born,	36
Asthma,	1	Croup,	1	do. Inflammatory,	3	Hæmorrhage,	1	Neurosis,	1	Teething,	2
Burns,	2	Dispepsia, or Indigestion,	16	do. Pleurisy,	7	Hooping Cough,	1	Old Age,	48	Diseases not mentioned,	39
Cancer,	1			do. Pulmonic,	41	Hydrocephalus,	2	Palsy,	6		
Casualty,	9	Drowned,	15	do. Puerperal,	5	Hydrops Pectoris,	2	Poison,	1		
											786

Published by order of the BOARD OF HEALTH,
NATHANIEL GREENOUGH, *Secretary.*

BOSTON, *January* 10, 1814.

☞ BOSTON lies in 42, 23, 15, N. lat. and 70, 52, 42, W. lon.—The Census of 1810, in the month of August, states the number of inhabitatants at 33,250.

⁂ *From Dec.* 31, 1811, *to Jan* 1, 1813 *(one year), the whole number of Deaths was* 682. *According the above table, there were* 104 *deaths more during the same period in the year* 1813.—*During one year and* 3 *months ending Dec.* 31, 1811, *the deaths were* 942.

To the President of the MGH Corporation:

"The Board of Health of the Town of Boston have the honor to transmit to your respectable institution a bill of Mortality for the Town of Boston for the year 1813 wishing that a speedy peace with prosperity, health and happiness may be extended and continued to our common country."

A portion of the abstract of the bill referred to in the above letter is reproduced here.

MGH *News*

Vol. 28 No. 9 MASSACHUSETTS GENERAL HOSPITAL, BOSTON, MASSACHUSETTS November, 1969

Medicaid: Wasted Millions of Dollars; Empty Beds

The Director of Social Service at MGH is peering through one of the loopholes in the nation's Medicaid programs, and she dislikes what she sees:

- Millions of wasted taxpayer dollars.
- Thousands of unused extended care facility beds.
- Thousands of misused hospital beds.
- Extended care facilities being paid to keep beds vacant while crowded hospitals seek in vain to admit patients to them.
- Inferior patient care.

The loophole distressing Miss Eleanor Clark is the system under which state authorities reimburse extended care facilities for Medicaid patients (those disabled or too poor to pay for medical care). As carried out in Massachusetts, for example, the facility gets a maximum of $20 a patient day.

By contrast, Medicare, which benefits those people over 65 years old, sets no limit. The Greater Boston maximum tends to reach $40. What's more, by limiting admissions to Medicare-eligible patients, extended care facilities can collect from the federal government the entire expense of operating every bed, even though most of them are empty.

Miss Clark cited the hypothetical example of a 100-bed institution. If Medicare patients occupy 40 of those beds, and the rest remain empty, Medicare will pay the institution all the expenses entailed in operating a 100-bed facility.

"Therefore," Miss Clark said, "the extended care facility does better to

(Continued on Page 3)

Cyclotron Halts Excess Growth in One Dose

Ralph stood 7 feet, 2 inches tall, and, at 20 years old, was still shooting up.

He came to the MGH endocrine clinic to find out why. Ralph learned he was a victim of acromegaly, a disease resulting from the overproduction of growth hormones.

If it occurs in childhood, it is called acromegalic gigantism and produces giants like Ralph. Adults experiencing the hormone overproduction suffer from acromegaly in which the hands and feet enlarge, and facial features like the nose and jaw become exaggerated.

In time most patients develop diabetes or high blood pressure. In some victims enlargement of organs like the heart lead eventually to heart failure. Ralph's disease had not yet reached that potentially fatal stage.

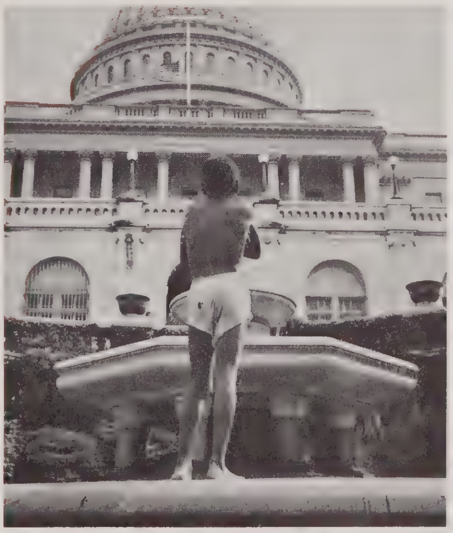
What's more, quite by accident, he had come to the only hospital in the world that can stop the ravages of acromegaly and even reverse some of them with a single radiation treatment. X rays require long-term treatment and can do no more than halt the progress of the disease.

The new MGH technique employs Harvard University's 160-million electron volt cyclotron. Dr. Raymond N. Kjellberg, Assistant Neurosurgeon at the MGH, and Dr. Bernard Kliman, Assistant in Medicine, have recently reported results on 46 cases to the World Congresses of Neurological Sciences meeting in New York City.

In 21 patients, the telltale level of growth hormone in the blood has dropped to a normal level. In another 15 the blood hormone level has fallen to less than half what it was. The remaining 10 have failed to show any significant degree of improvement.

Only surgery has achieved as good results. But surgery carries with it some threat of death and increased risk of complications. After an operation, patients require weeks of convalescence before they can return to work, and usually need multiple medications to replace hormones that the pituitary, before its destruction, normally put out.

(Continued on Page 4)



"While the American conscience structure dictates that all men should be treated equally, and 'are endowed by their creator with certain inalienable rights,' these rights are not respected insofar as black Americans are concerned." (See story on page 6.)

MGH *News*

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EDITORIAL:

A Woeful Experience: Time for Change

The nation gave birth to Medicare and Medicaid on the same day, July 1, 1966. Medicare brings its health care benefits to all people over 65. It is a solely federal program, sponsored by Washington and paid for through and administered by the Social Security program.

On the other hand, Medicaid was sponsored by the federal government but is paid for partly through the federal government and partly through the states. Each state sets its own financial eligibility criteria for Medicaid. In general, benefits go to disabled persons like the blind, regardless of age, and families with income below minimums set by each state.

When the two programs were born, the public focused attention on Medicare. Newspapers bannered headlines about the start of Medicare and largely ignored Medicaid. In part the public snub of Medicaid derived from the fact that the program became effective in a state only after its legislature passed the necessary implementing legislation. As a result, individual programs were slow in starting.

For the most part, however, the lack of public attention arose from a dearth of knowledge. Except for people married to medicine, few in the nation realized the significance of Medicaid. Recent experience has awakened the public. What they have learned is that Medicare and Medicaid differ vastly in effectiveness. Even many former critics acknowledge that Medicare is operating reasonably well – that it can stand improvements but is generally providing the kind of care that many persons over 65 years old could never before afford.

On the other hand, Medicaid has proven a poorly conceived concoction. Some states like New York and Massachusetts have cut back drastically on benefits and/or stiffened eligibility requirements to reduce drains on their budgets. Scandals, inequities and waste mark the programs.

Now the *MGH News* in a page one story has disclosed another Medicaid morass. Miss Eleanor Clark, the hospital's Director of Social Service, describes how millions of taxpayer dollars are being wasted in a Medicaid oversight that is causing: the misuse of hospital beds, empty beds in extended care facilities and inferior patient care. The time has come for Congress to take new action on the Medicaid law, basing its changes on the woeful experience of three years.

Letters to the Editor

Dear Editor:

It is always a pleasure to receive the *MGH News*. It keeps me up with things that are going on in a very wonderful hospital – one very different, at least physically, from the MGH of my day.

I was particularly pleased with two fairly recent articles: "World Transplant Center" and "Coronary Care Unit." Their contents indicated emphatically that MGH is really in the van of medical progress.

Clark Young, M.D.
E.S. '21-'23
Salt Lake City, Utah

* * *

Dear Editor:

Mrs. Devan (MGH 1913) and I are pleased to receive regularly the *MGH News*. It makes us feel in touch still with the delightful days of our association with that Cathedral of Health on the Charles River.

I write particularly to say that I have a copy of the *News* for October 1942.

I understand that this is Vol. 1, No. 1 of what is really the fourth series of the *News* – the third series was discontinued in 1932.

This copy has a fine picture of the 6th General Hospital-Massachusetts General Hospital Unit . . .

Thomas Alan Devan, M.D.
St. Petersburg, Fla.

(Editor's Note: The 6th General Hospital was activated for service on May 15, 1942, with 26 staff members and 53 nurses from the MGH. It was mustered out on Sept. 15, 1945, after serving in North Africa and Europe).

The *MGH News* welcomes letters from its readers. To avoid condensation, letters should be brief and must be signed. Names will be withheld on request.

With its September issue the circulation of the *MGH News* increased from 7,000 to about 40,000. The expanded list of subscribers is being computerized. The operation is a complicated one and undoubtedly mistakes will be made in the initial months. Your patience and understanding are appreciated.

Medicaid: Inferior Patient Care; Empty Beds

(Continued from Page 1)

keep empty beds than to accept a Medicaid patient. The cost to the federal government of paying for all the empty beds is outrageous."

In Massachusetts roughly 30 percent of the beds in extended care facilities remain unoccupied.

"Yet we have an extremely difficult time finding a bed for a Medicaid patient who needs extended care after a hospital stay," Miss Clark said.

"We end up having to keep the patient here longer at perhaps $80 a day when much less comprehensive and less expensive care is called for. The government thus has to pay $80 a day in one institution at the same time it is paying to keep beds empty in another."

The details Miss Clark described come from her experiences with the Massachusetts Medicaid program. Within limits prescribed by federal law, each state sets its own rules. However, Lawrence E. Martin, Associate Director and Comptroller of the MGH, said the same general loophole applies in most states.

Millions Wasted

"It is safe to say," he stated, "that millions of dollars are being wasted nationally."

Mr. Martin said it would be impossible to make a meaningful estimate of how many millions. Nor would it be possible to figure the number of wasted beds in the country.

Unable to get Medicaid patients into good extended care facilities, the hospitals often have to settle for a compromise institution that fails to offer the type of care needed for a particular patient. Inferior placement results in inferior care.

"The original philosophy," Miss Clark said, "was to provide Medicare and Medicaid patients with the same quality care wealthier people can buy for themselves. Medicaid patients were to get the same care made possible by Medicare.

Unequal Care

"As long as they continue to have unequal reimbursement formulas, unequal quality of care will persist.

"People will get the same care in acute hospitals like the MGH. If they need extended treatment in another facility, however, the patients who can pay privately or are on Medicare and can thus get into good extended care facilities will receive a totally different quality than those on Medicaid."

What Miss Clark suggests as a solution is a parallel reimbursement formula for Medicare and Medicaid patients in extended care facilities across the country. Such a parallel formula was the intention of the federal government when the two programs went into effect in July of 1966. In practice, however, the discrepancy arose.

Alternative Suggested

Should an equalized reimbursement formula prove impractical, Miss Clark suggests an alternative.

"It might be possible," she said, "to have the Medicare formula that spreads costs over occupied beds function in this way only if the extended care facility has, say 80 percent occupancy. If occupancy dips to 75 percent, there could be a corrective factor providing enough of a penalty to encourage the use of beds.

"At any rate, one thing is sure. The government needs some formula for not rewarding empty beds."

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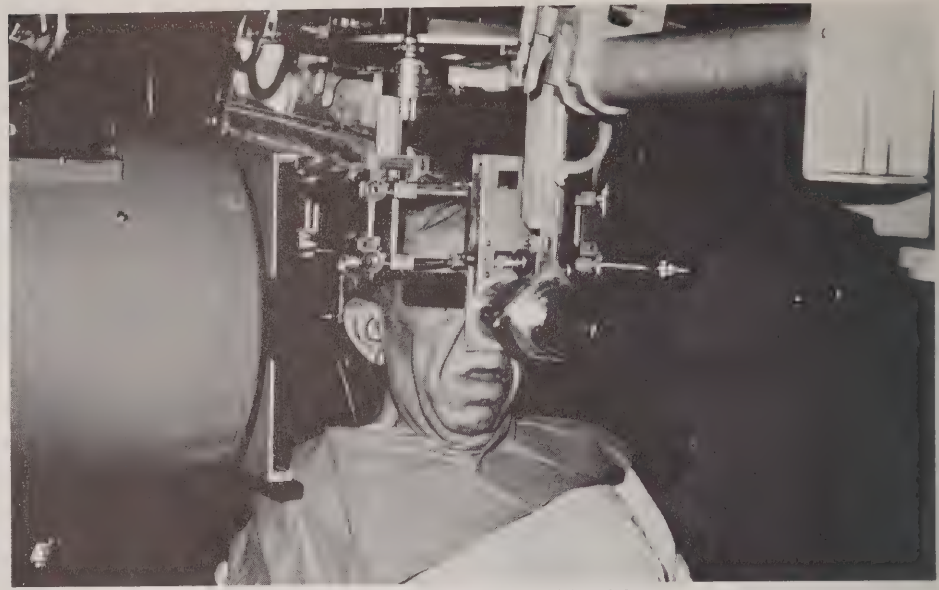
"Better To Keep Empty Beds"

A room in a Boston extended care facility.

Cyclotron Halts in One Treatment A



Acromegalic patient with special head frame (stereotactic) affixed to skull.

(Continued from Page 1)

Dr. Kjellberg said that with the MGH method, complications are fewer and patients can return to work after a two-day hospital stay. Only 10 percent require some degree of replacement medication.

In Ralph's case, the procedure was done seven months ago at the cyclotron on Quincy Street. Under local anesthesia, a special head frame (stereotactic) was affixed to his skull.

The design of the frame permits the head to rotate about the target point deep in the brain (the front part of the pituitary, the gland which produces growth hormone).

Dr. Kjellberg's team used 12 entry points, six on each side of the head. In a method designed by the team, each proton beam passes through a water-filled adjustable absorber to control the depth of its penetration.

Aiming two beams at a time from ports of entry on opposite sides of the head, the surgeons make the beams converge and stop at the target areas.

The point at which a beam stops gets double the ordinary amount of radiation. By halting the two beams at the point at which they converge, another doubling results.

"Thus, we get four at the cost of one," Dr. Kjellberg said. The Assistant Clinical Professor of Surgery at Harvard Medical School added, "This puts a large amount of radiation in the pituitary and minimizes the radiation in surrounding tissue."

The only other cyclotron in the world that is used for proton-beam therapy (at Berkeley, Calif.) requires six doses over three weeks because the beams are employed in a conventional way.

Ralph's complete treatment ended in 90 minutes. He was awake and able to talk during the entire time. When the procedure had ended, the concentrated proton particles had begun to destroy the pituitary tumor which in acromegaly produces excessive amounts of growth hormone. Dr. Leonard Deftos of the Endocrine Unit followed his progress at later visits.

"Within three months," Dr. Kliman said, "the growth hormone level in the blood fell into the normal range. There has been no further growth. From all the evidence he would have still been shooting up beyond his present 7 foot 2 without treatment.

"Before the procedure, he was weak and had failed to reach sexual maturity. Now his strength and energy are normal for a person his age.

"We have recently treated him with gonadotropin, a kind of pituitary hormone, which resulted in normal sexual maturation."

The MGH group headed by Drs. Kjellberg and Kliman have treated 115 acromegalic patients, including the 46 for whom they have sufficient follow-up time to analyze the results.

"They include people from all walks of life and from 11 to 67 years old," Dr. Kliman said. "Among them," the Assistant Professor of Medicine at Harvard Medical School added, "are professional people who quite frequently have had to give up their profession. The reason is usually diabetes, hypertension (high blood pressure), or excess fatigue."

As was the case with Ralph, successful treatment often restores energy. The treatment can also improve the appearance of the victims, who, unlike Ralph, suffer changes in facial features. Ab-

Dr. Raymond N. Kjellberg studies head X rays (pneumoencephalogram) of patient with acromegaly before using cyclotron.

bnormal Growth Caused by Disease

Andreas M. Koehler, Assistant Director of Harvard Cyclotron Laboratory, and Mrs. Nancy McManus, a technician, at controls of cyclotron.

normal growth in bone structure cannot be reversed, but soft tissue changes such as swollen skin and a fleshy nose can be improved. Patients whose symptoms disappear can also have cosmetic surgery to correct bone overgrowth in the jaw.

Last April Drs. Kjellberg, Stanley Feld and Kliman reported similar work with Cushing's Disease. That ailment's symptoms often include weight gain, muscle weakness, rounding of the face and easily bruised skin.

The late Dr. Harvey Cushing of Peter Bent Brigham Hospital had proposed attacking the pituitary gland with X rays. Later, scientists got inconsistent results, and the technique fell largely into disuse.

The accepted technique became to remove surgically the adrenal glands situated near each kidney. Scientists reasoned that since those glands enlarge in Cushing's Disease, the adrenal and not the pituitary is the ailment's cause.

However, removing the two adrenal glands has been known to have limitations.

Using the cyclotron in virtually the same way they did with acromegaly, the MGH-Harvard group bombarded the pituitary with proton beams. They treated 25 patients this way.

All 18 on whom they have follow-up information have improved. Symptoms completely disappeared for eight of them.

For 10 others symptoms have nearly disappeared. There is indirect evidence of one failure, but not among the 18.

Three of the patients have experienced temporary episodes of double vision. To date, these have been the only complications. On the basis of their results, the MGH-Harvard group believe they have proved Dr. Cushing right in his theory that the pituitary deserves chief blame for the disease.

The MGH-Harvard group conclude that their treatment for acromegaly and Cushing's Disease "is a practical medical resource for a wide geographical area."

Patients have come from at least 30 states, five Canadian provinces and four other nations.

The physicians term the treatment "relatively safe, effective, convenient and economical compared with other methods. Clinical research continues to add to understanding and therapy of afflicted patients."

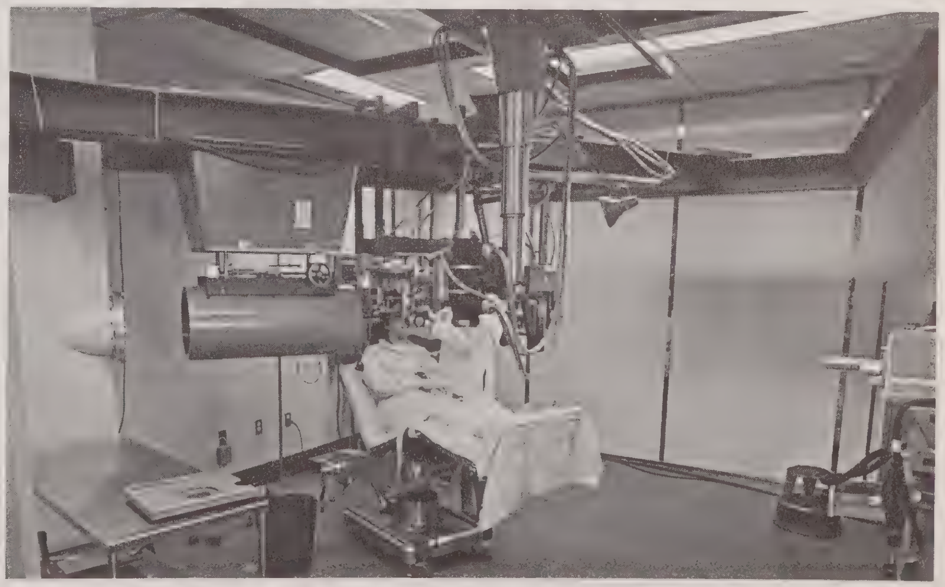
Among the other uses for the cyclotron are treatment of the pituitary gland in patients with breast cancer that has spread and direct bombardment of cancerous brain tumors. There is a possibility of expanding the uses for still other diseases.

Harvard University owns the building which houses the cyclotron, but the Navy owns the device itself. The Harvard department of physics supervises the machine and administers the selected dose. William Preston and Andreas M. Koehler are in charge of the therapy procedure.

Because the MGH uses the cyclotron on a part-time basis, Harvard sells time on the machine to NASA and the Air Force for experiments in space radiation.

Unless funds are obtained, the cyclotron is scheduled to be phased out of use next June 7.

"We need the support from the government or some private agency," Dr. Kjellberg said, "for continued use for a medical community that is virtually half the United States."



Harvard cyclotron in use.

Is Racism Linked to White Ego Identity?

White Americans, in the eyes of a New York psychiatrist, use racist thought and behavior to deal with aspects of their own psychological makeup that they cannot accept.

This use of racism stems from the history of the United States, including its religious background and the development of a brand of slavery peculiar to this country, according to Dr. Hugh F. Butts.

Dr. Butts is Associate Director of the Department of Psychiatry at Harlem Hospital in New York. He expressed his views at a lecture here and at a follow-up interview with the *MGH News*.

Using an ego (self) identity of white Americans described by Erik H. Erikson in *Childhood and Society* as a springboard, Dr. Butts proposed that personality development of Americans helped form racist institutions.

History of Contrasts

The American's identity, because of a history of extreme contrasts and abrupt changes, is built on an active combination of polarities, or pairs of opposite principles, according to Erikson. Examples of such polarities are migratory and sedentary, individualistic and standardized, competitive and cooperative, pious and free-thinking, responsible and cynical, etc.

Erikson believes that these polarities have formed two sets of "truths." One is a set of puritan, religiously pronounced, political principles, and the other is a set of "shifting slogans," which rely on moods, hunches or notions.

Parents, especially mothers, who since frontier days have been the authority on morals, teach their children certain values, like being thrifty, neat and self-controlled.

Grow Up Confused

"Children listen and believe, but observe opposite behavior in their parents," Dr. Butts said. "They grow up confused."

Continuing, he said that behavior and ideology are frequently dissimilar. One way of dealing with this disparity is to deny the conflict in oneself by regarding the less acceptable characteristics of the polarities as belonging to someone else.

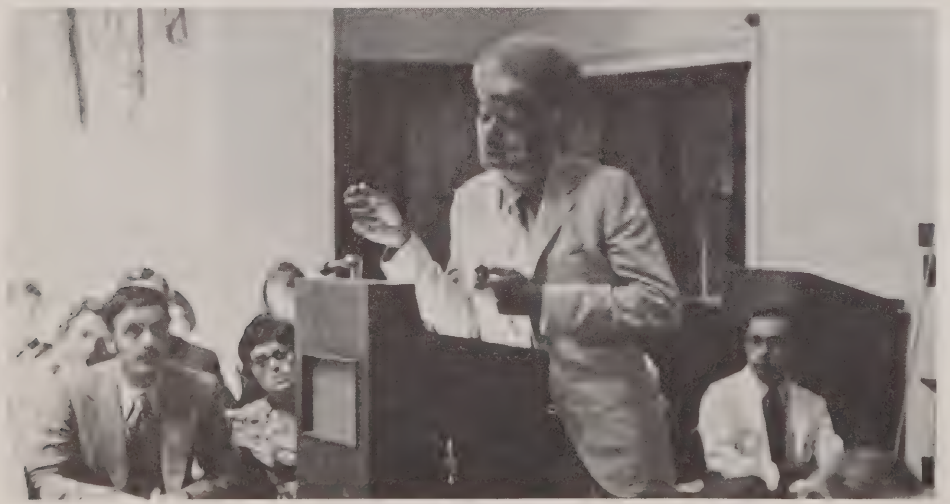
"This process serves the added value of enabling the white person to then act hostilely (at times violently) toward the scapegoat onto whom he has projected his own unacceptable thoughts and feelings," Dr. Butts said.

Reviewing the development of slavery in this country, Dr. Butts asserted that its practices made it easy for white Americans to "equate white with superiority, purity and excellence, while regarding black as synonymous with inferiority, evil and ignorance.

Rights Not Respected

"The psychopathology of white America has been projected onto the 'natural' scapegoat–black Americans.

"While the American conscience structure dictates that all men should be treated equally, and 'are endowed by their creator with certain inalienable rights,' these rights are not respected insofar as black Americans are concerned. In order to justify the abrogation of Negroes' rights, they are defined as having certain characteristics which justify their treatment.



DR. HUGH F. BUTTS

"The dedication and commitment of every American institution to the doctrine of black inferiority during the slave period has had profound effects upon the shape and direction of post-slavery institutions in America," Dr. Butts said.

"If blacks are presumed to be inferior, unintelligent and uneducable, efforts, even by consciously well-meaning white teachers in ghettos, are ineffective because of the operation of the basic hypothesis on the unconscious level."

Other institutions still display the existence of the polarities–one acceptable, which is the principle, and the other negative, which is often the practice.

Nonviolent?

"For instance," Dr. Butts said, "we call this a nonviolent nation. Yet it is really violent – look at the war in Vietnam." And because violence is unacceptable, it is part of the black's stereotype.

"The definitions of blacks as violent, inferior, promiscuous and irresponsible have given rise to certain institutions which serve to perpetuate these definitions. Thus, if black people are defined as violent, police practices are encouraged which provoke violent group reactions among black people."

Dr. Butts, who spoke at Grand Rounds of the Department of Psychiatry, does feel, however, that there is a solution. The ego defect in white Americans appears to be unconscious, culturally transmitted, but modifiable by education.

Education Called For

"Racism must be educated, coaxed, wrenched or stamped out of the various societal institutions that perpetuate it–namely, the police force, courts, unions, legislature, schools, industry, welfare services, professional organizations, etc.

". . . With education, people become aware of their behavior. With changes in institutions, there are changes in behavior. Leadership of institutions must take the initial step. If the leadership is responsive, changes can be made."

Progress has been made recently, but Dr. Butts does not see the "commitment to radical institutional change" he feels is necessary. However, he said, "I will continue to hope and to work."

Did MGH Pioneer in Intensive Care Units?

(Continued from Page 8)

"Every July," Miss Craffey said, "new interns come and say, 'Oh, Bulfinch,' and kind of turn their noses up at the old building.

Develop a Feeling

"Then they get involved in the unit and develop a real feeling for it. Nurses who go there to work at first may be snobbish, but something happens to them, too.

"Maybe it's a feeling of history. At any rate, it is a very close unit, and an esprit de corps develops.

"It is an exciting place and a marvelous place for nurses to learn. Many would not want to work anyplace else. Even the interns come back, and the things they remember are some of the night duties on Bulfinch 3. They say they can learn more in their brief period at B-3 than in four years in medical school."

Bulfinch 3 as an intensive care unit.

While Bulfinch 3 easily merits being called the hospital's oldest continuous form of intensive care unit, the facility that most resembles it in use is one of the newest. The medical intensive care unit on the sixth floor of the Baker Memorial building opened in October of 1968 with 16 beds.

Baker 6 houses patients with exactly the same types of illnesses as Bulfinch 3. While much newer than the renovated Bulfinch unit, Baker 6, like the 14 noncoronary care beds of Bulfinch 3, lacks central monitoring.

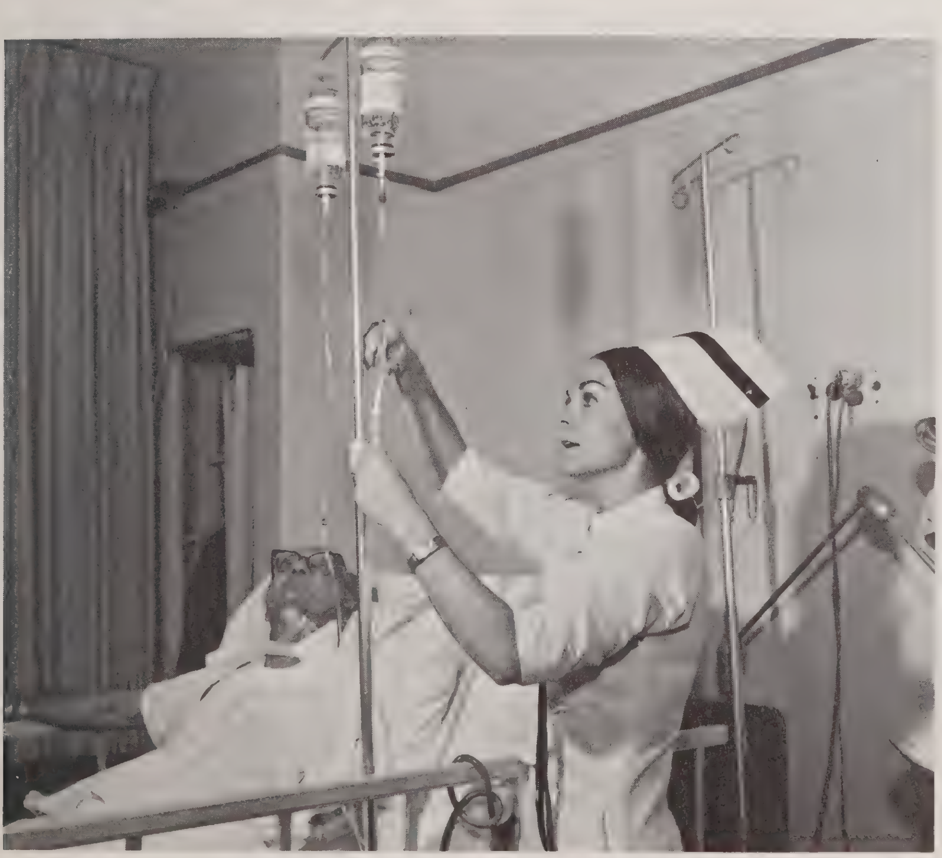
The main difference between the two units stems from the fact that ward patients go to Bulfinch 3 and private patients occupy the 16 single and double rooms of Baker 6. Unlike the Bulfinch 3 patients, the ones on Baker 6 have private physicians and the unit has Dr. Peter Yurchak, a private physician, to supervise its operations. Miss Margaret Stack heads the day-shift nursing team.

Very Fortunate

"We are very fortunate," Dr. Yurchak said, "in having the house staff [interns and residents] never more than one flight of stairs away. House staff and private staff work closely together in contact that enhances the teaching and patient care."

As in Bulfinch 3 and other intensive care units, nurses working in Baker 6 receive additional training and with experience become specialists.

"From the very beginning," Dr. Yurchak said, "it's been the nursing department that has been the key to this unit's success."



Miss Dana Horton, R.N., checks intravenous (IV) level in Baker 6 intensive care unit.

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MASSACHUSETTS GENERAL HOSPITAL

IN THE 1870's

Did MGH Pioneer in Intensive Care Units?

MGH may have the intensive care unit to add to its list of pioneering achievements in medicine.

Medical historians usually trace the idea either to World War II or the postwar period.

In the course of interviews and research for its series of articles on such units, the *MGH News* learned that at this hospital the concept apparently dates well into the 19th century.

Miss Ruth Sleeper, former long-time director of the School of Nursing and Nursing Service, links the origin of ICU's here to pavilion wards. She said that some time after those wards were built beginning in the 1870's, some of them began to concentrate on the care of the very sick.

But It Was

"The hospital didn't call it intensive care," Miss Sleeper said, "but it was."

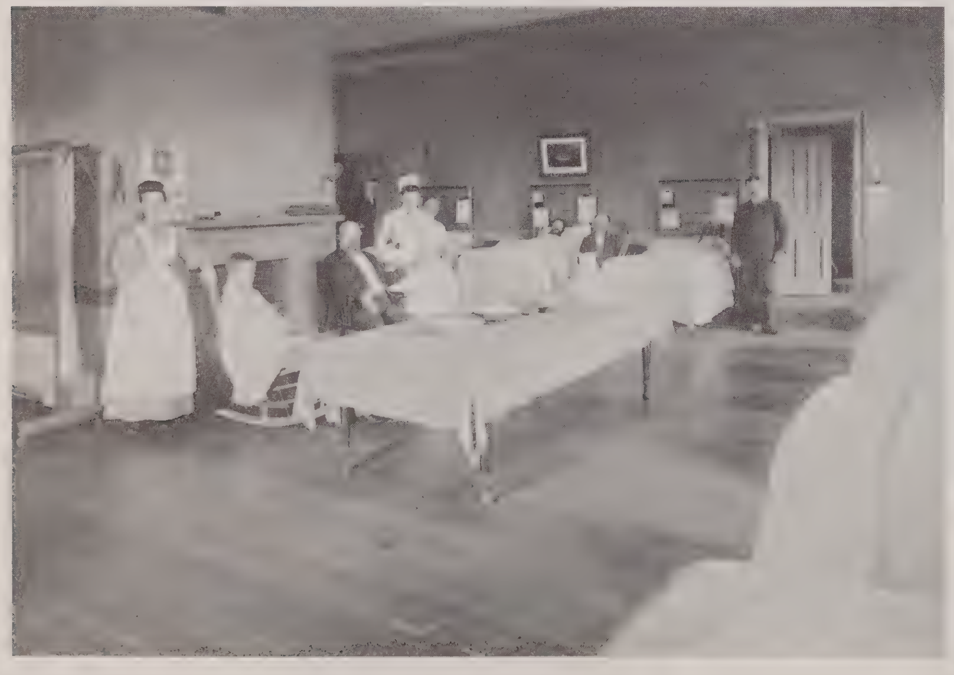
Even so, the MGH cannot claim sole credit for pioneering in this field. As an editorial in the April *MGH News* noted, at least one crude version can be traced to the 32-bed wards of Florence Nightingale.

At the MGH, however, the concept seemed to develop and persist. While the old pavilions eventually gave way to the new structures, some form of facilities for intensive care moved into the oldest of all MGH buildings, the famed Bulfinch.

Double Room

"Between the wards there was a double room that still exists in the east end of Bulfinch," Miss Sleeper said. "Way back it was a nurse's bedroom at night and a doctor's sitting room during the day.

"Later, it became a double room for very ill patients."



Bulfinch 3 when it was a ward.

About 1941 part of the third floor of the historic building was divided into smaller units specializing in the care of the very sick medical patients and of patients requiring isolation.

Several years later the U.S. Public Health Service supported an experiment in what has been regarded as the first progressive care in the country (at Manchester Memorial Hospital in Manchester, Conn.). Intensive care formed a part of progressive care, and the idea quickly caught on around the United States.

Several MGH nurses commented when told of the new concept:

"Why, we've had ICU's at the MGH for a long time."

While Bulfinch 3 was a form of ICU, it did not completely meet technical criteria. Even today the unit falls somewhat short of technical requirements.

Lacks Central Station

It lacks a central station from which nurses can monitor the 14 beds not housing cardiac patients. Nor can the nurses from any one spot observe many of these 14 patients in their one-bed or two-bed rooms.

The remaining four beds comprise a coronary care unit built in 1966. Less sophisticated than the newer coronary care unit in the Phillips House, it nevertheless provides central monitoring and a group of nurses trained in coronary care.

Unlike other intensive care units in the hospital, Bulfinch 3 lacks a physician-director. Residents and interns staff the facility for which the head nurse is Mrs. Barbara Mahoney, R.N.

Even with its drawbacks, Mrs. Mahoney and Miss Regina Craffey, R.N., a former head nurse there, believe the unit provides exceptional care to its patients who suffer the gamut of medical problems from bleeding ulcers to heart disease.

(Continued on Page 7)

MGH News

Vol. 28 No. 10 MASSACHUSETTS GENERAL HOSPITAL, BOSTON, MASSACHUSETTS December, 1969

What Sets Ann Mary Apart Is That She Is Alive

Ann Mary Flanders is a bright, alert 9 month old who likes to pull hair and play peekaboo.

Those characteristics do not make her very different from her six sisters and brothers at the same age.

What sets Ann Mary apart is the fact she is alive at all.

Last March 15 MGH surgeons performed open-heart surgery on her. At 5 pounds, 2 ounces, Ann Mary was the smallest patient ever described in medical literature to undergo a cardiac operation using the heart-lung machine.

She was born nearly four weeks earlier in Waltham Hospital. For 21 days physicians kept her there to observe her condition.

Dr. Albert Cohen of Brookline referred the child to the MGH. Ann Mary was admitted on March 15.

"She was already in profound heart failure," said Dr. Allan Goldblatt, Chief of Pediatric Cardiology.

By inserting a tube up her arm until it reached her heart (heart catheterization), doctors had determined her problem.

She had been born with a heart condition called total anomalous pulmonary venous drainage. In effect, after getting fresh oxygen from the lungs, her blood was being drained into the upper right chamber of her heart.

Accumulating on that side, it would then return to the lungs only to go back to the upper right heart chamber again.

Normally blood carrying oxygen from the lungs flows to the upper left chamber of the heart, not the upper right. Then that oxygenated blood en-

(Continued on Page 4)

ME AND MY TEDDY BEAR
Ann Mary Flanders, the smallest patient in medical literature to undergo surgery using the heart-lung machine.

From Paralysis to 100-Yard Dash in 1 Year

(Seventh of a Series)

For three months the 18-year-old youth lay paralyzed.

For three months his sole means of communication was to raise his eyebrows.

And for the most critical portion of those three months MGH physicians slept in his room.

One year later he was running the 100-yard dash for Brown University.

That is the way things often are with victims of Guillain-Barre syndrome. An ailment of unknown cause, its most serious symptom is severe paralysis.

"The paralysis is completely reversible," an MGH neurologist said, "if we can keep the patients alive." Before 1966, though, many of the victims of the ailment treated at the MGH died.

What probably had kept the dashman alive at the hospital in 1957 was the fact that for the critical period of his illness, physicians virtually never left his side. At the slightest change in his condition, they were prepared to alter medications, adjust the respirator (a device used to take over breathing or to assist it), or do any one of the number of complicated procedures to keep him living.

Nurses trained to treat such complicated cases simply did not exist. Nor is it routinely feasible for doctors to spend all their time with one patient.

Fortunately, Guillain-Barre syndrome is fairly uncommon. Although a center for its treatment in New England, this hospital sees only from five to ten patients a year. Yet there are a number of other ailments treated here that require similar care.

In 1966, the hospital established its Neuromedical-Neurosurgical Intensive Care Unit on the 11th floor of the White Building. Specially trained nurses under the direction of Dr. Raymond D. Adams, Chief of Neuromedicine, and Dr. William H. Sweet, Chief of Neurosurgery, staff the unit.

Between that unit and the Respiratory Unit (June-August, *MGH News*), the hospital has greatly cut down on deaths from Guillain-Barre syndrome. With victims now being treated in the two units, only 1 of 25 patients (four percent) has died in the past three years. The national average is 10 to 20 percent mortality.

(Continued on Page 6)

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EDITORIAL:

A Long-Run Threat to World Health

America has a tradition of building better mousetraps. From Eli Whitney's cotton gin to Edwin Land's Polaroid camera, research in this country has emphasized the practical. Indeed, America's inventions have contributed in a large measure to its industrial preeminence.

Because of this tradition of practical research, the country has long been regarded abroad as a nation of tinkering gadgeteers. Slowly this image has been changing. Aided by a steady stream of Nobel prizes for research as basic as studies on the structure of the genetic substance DNA, the American scientist has been emerging from this now false facade.

In no small part, his new image results from the increasingly generous support of the federal government. Washington's generosity has paid off with a number of practical results that are saving the lives and health of many people. To name just one example, Dr. John Enders' basic polio virus research laid the foundation for Dr. Jonas Salk's applied research. The result was the elimination of polio through the polio vaccine.

Now, however, there is a new threat to basic research. A page 8 article in this issue of the *MGH News* describes the concern of scientists that the federal government is ready once more to relegate such research to the role of a stepchild. Should that concern become a long-range attitude on the part of Washington, the country would be leaping backward toward the era of tinkering gadgetry.

No one can argue that practical research lacks importance. On the contrary, aside from the philosophical nicety that often pervades basic research, the only excuse for such fundamental investigation is that it opens the way to many new avenues of practical study. One basic research project can result in hundreds of applications to help patients.

As Dr. Kurt J. Isselbacher states in the page 8 article: "Some might argue that scientific investigation aimed at finding improved ways of treating patients can go on for a time without the stimulus of and new information from fundamental research. Eventually, however, the well of ideas dries up."

Pursuing this argument, one might conclude that a year or two of mild cutback would hurt but not kill basic research. The trouble with that corollary, however, is that it fails to take into account human nature. Once a cut comes in one area of a budget, the tendency is to say, "Oh, that didn't hurt too much. Let's do it again." Such a trend would prove catastrophic. In the long run the health of the entire world would suffer if the well of ideas is allowed to dry up.

Allergy Clinic Treats 50 Years of Wheezes

Fifty years ago a person suffering from asthma may well have been reduced to an invalid by the disease. In 1969, the same person could be leading a normal life.

It was 50 years ago that the Allergy Clinic was established at the MGH. (Until 1936, it was called the Anaphylaxis Clinic. The word allergy, meaning "strange reaction" in Greek, did not come into use until the 1930's.)

Hay fever had been recognized for 100 years in 1919, but skin tests were only beginning to be used to diagnose other allergic diseases, like asthma. Before this time allergic diseases were viewed as nose and throat diseases only.

But during the second decade of the century, "it became clear that hay fever, like asthma, was due to a sensitiveness of the body as a whole," wrote Dr. Francis M. Rackemann in a history of the MGH unit. "Even though the symptoms might be limited to the nose and throat, the disease was general and not local."

First Clinic Head

Dr. Rackemann brought together the scattered work on anaphylaxis in 1919 when he became the first head of the clinic. In that year about 20 patients were seen by Dr. Rackemann in every session of the clinic.

The clinic now treats 70 to 100 patients every Tuesday. The staff, headed by Dr. Francis C. Lowell, includes nine doctors and three clinical and research fellows.

Four of the doctors are from the Allergy Unit, also headed by Dr. Lowell, and the others are physicians from the area, mostly internists, who are interested in allergy.

Dr. Lowell estimates that 20 to 30 percent of the American population have some degree of allergy. "However, only 5 to 10 percent have or have had asthma of sufficient severity to do something about, and about 15 percent have hay fever that is severe enough to treat. The tendency to become allergic is inherited.

More Than Ragweed

"Hay fever is the conventional allergy," Dr. Lowell said, "but includes more than reaction to ragweed pollen." Properly called allergic rhinitis, the symptoms of sneezing, nasal congestion, and running nose can be caused by other pollens, molds or inhaled substances.

"People recognize sneezing and itching eyes in June as 'hay fever,' but may attribute the same symptoms in May to a head cold. They may actually be an allergic reaction to birch and oak pollen."

Animal danders (small scales of skin) and house dust are other common causes of such symptoms.

"It is amazing how sick people can be and not know that an animal at home is the cause," Dr. Lowell said.

As for house dust – "We really don't know what it is. It is a complex mixture of dirt tracked into the house, animal and human danders, pollen, lint, mold and spilled food which has become dried and pulverized."

Cause Not Known

In many allergic reactions the cause is not known. Dr. Lowell said that only about 30 to 50 percent of patient symptoms are due to a recognizable cause.

"At the clinic, the main problem we treat is asthma," Dr. Lowell said, "the disease that interests us the most." Those with seasonal allergies find it easier to go to their private doctors for their periodic injections, so the seasonal load at the clinic is relatively small.

Since the establishment of the clinic there have been two major developments in drug treatment for allergies. During the 1940's antihistamine drugs came out. These are most effective against hay fever (allergic rhinitis). Corticosteroid drugs, such as cortisone, were introduced in the 1950's and are effective in most types of allergy. Due to these drugs, many people with severe chronic asthma can now lead normal lives.

The MGH Allergy Unit was one of three American centers chosen to study a new drug which was developed in England for the treatment of asthma. In a 1967 double blind study (one in which neither patient nor doctor knows whether the patient is getting medication or an unmedicated substitute), the drug was shown to be effective. It is still under investigation.

Study of Injections

The Allergy Unit is located on the fourth floor of the Bulfinch Building, where most of the research on asthma, hay fever and related diseases is done by Dr. Lowell and Dr. William Franklin, Assistant Physician, with the technical assistance of Mrs. Marsha Williams.

Dr. Francis C. Lowell checks the Allergy Clinic's spirometer, a device that measures vital capacity of the lungs (the amount that can be blown out after a big breath).

In another double blind study there, the unit demonstrated that injections of ragweed pollen extract were unquestionably effective in preventing or decreasing symptoms caused by ragweed pollen.

Resistance to the therapeutic effect of the corticosteroid drugs was also studied. The physicians had noticed that some asthmatic patients required much more than the normal dosage in order to get relief.

Dr. Lowell explained that counts made of certain white blood cells called eosinophils, known to be helpful in diagnosing allergy, are also helpful in detecting resistance to the cortisone-like drugs.

Increase in Number

During allergic disease these cells, which have an affinity for the dye eosin, increase in number roughly in proportion to the severity of the disease. When drugs like cortisone are given, the eosinophil count decreases in proportion to the dosage. However, in drug-resistant patients, the doctors found that the decrease in eosinophils was much less than that of nonresistant patients.

Also, the drug disappeared from the blood more rapidly, and resistance was not necessarily permanent. It turned out that these patients were not only resistant to the beneficial effects, but also the detrimental effects of the drugs.

"The study is important," Dr. Lowell said, "because a very sick patient could die if one failed to recognize that exceptionally large doses are needed. Giving ordinary doses might be tantamount to no treatment at all."

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The Smallest Patient Known To Undergo Surg

(Continued from Page 1)

ters the lower left chamber to be pumped into the main artery, the aorta.

The aorta then starts the vital oxygen-bearing blood on a journey to nourish cells, tissues and organs throughout the body.

Since most of the fresh oxygen from Ann Mary's heart never circulated beyond the right side of the heart itself, her condition was fast worsening. She weighed one ounce less than at birth. Her heart beat rapidly and her breathing was abnormal.

Statistics show more than 80 percent of children born with Ann Mary's heart condition die in infancy. Usually they fail to survive the first weeks or months of life.

Faced with such facts, the MGH doctors decided to operate.

Residents Donate Blood

Just five hours after admission, a nurse wheeled Ann Mary into the operating room. There a team under Dr. W. Gerald Austen, Chief of Surgery, and Dr. Mortimer J. Buckley, Jr., Assistant Surgeon, began to operate.

Because fresh blood was needed, residents and interns stood by to donate their own.

Rigged with smaller than usual tubing, the heart-lung machine remained on for 56 minutes. During that time the surgeons used small instruments to move the wall separating the two upper heart chambers. When they were through, the veins draining blood from the lungs emptied into the left upper chamber instead of the right. Ann Mary's heart was normal.

The surgical procedure itself was no more difficult than any performed on a tiny heart with small instruments.

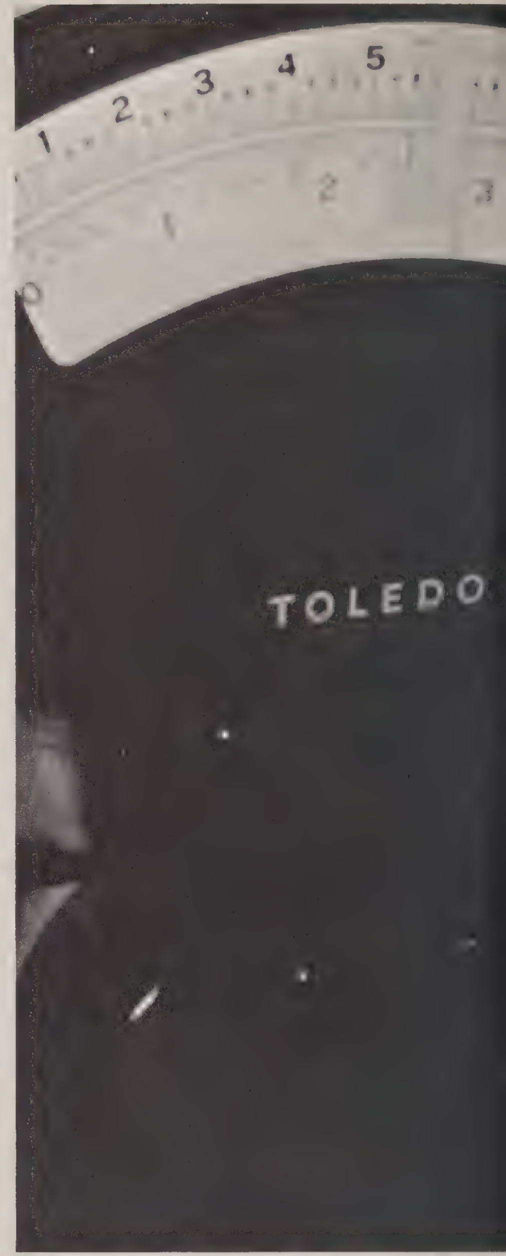
Continual Improvement

What made it possible is the MGH's heart-lung machine. An engineering graduate of MIT as well as a surgeon, Dr. Austen had continually improved the device over the years.

"He has combined the best from his own ideas and the best features of other machines in the country," Dr. Goldblatt said.

Heart-lung machines deliver oxygen to the blood and remove carbon dioxide, thus permitting the heart to remain blood-free and still during surgery. The trouble is that the machine tends to damage the blood if used very long. And the 56 minutes Ann Mary remained on the device is extremely long for a tiny infant.

"Our previous concern," Dr. Goldblatt said, "about whether we can put someone that small on this heart-lung machine no longer is valid. Theoretically, no baby is too small for our machine."



Six days after open-heart surger

Ann Mary is the center of attention in the Flanders family. Her brothers and sisters, from left, are Thomas P., 8, Mary E., 5, Kenneth F., 10, Patricia A., 6, Theresa A., 3, and James M., 9.

Complications the Rule

After surgery, complications are the rule for such babies. With Dr. Myron B. Laver, Anesthetist, and Dr. Goldblatt spending long hours with the child in the recovery room during the next three days, lung complications proved minor.

One week after surgery, Ann Mary

y Using Heart-Lung Machine

ary weighed in at 5 pounds, 8 ounces, six ounces more than on the day of the operation.

looked a healthy pink and her lungs were clear.

"She was really ready to go home eight days after the operation," Dr. Goldblatt said.

Ann Mary now weighs more than 14 pounds. The daughter of Mr. and Mrs. Kenneth Flanders of 200 Trapelo Road, Waltham, she gets around easily in her playpen and on the floor of her home.

"She's like our other children were," Mrs. Flanders said, "only a little more spoiled by them. Thank God she isn't our only child, or we would be hovering over her all the time.

"We're so grateful to the MGH. It couldn't have happened anywhere else."

The circulation of the *MGH News* has now increased from 7,000 to about 55,000. The expanded list of subscribers is being computerized. The operation is a complicated one and undoubtedly mistakes will be made in the initial months. Your patience and understanding are appreciated.

So You Think We Have Pollution?

Pollution – air, water, and sound – is a problem of current concern, with implications for the field of medicine.

If it seems like a thoroughly modern difficulty, it may be interesting to note that even back in the "good old days" a certain pollution problem – with its own medical side effects – existed.

The following is from an editorial in a July, 1913 Boston newspaper:

"Attention has been called to a stable yard that the city maintains at the corner of Fruit and North Grove streets: on one side offensively close to the grounds, tents and buildings of the Massachusetts General Hospital, on the other offensively close to the new home for the hospital's nurses: but the story has not been told in half its distressing detail.

75 Horses

"On this corner the city quarters in old buildings, many of them wooden, 75 of its heaviest horses; their bedding and manure are handled in the open air in that part of the yard closest to the hospital; their noises in the stalls are continuous, for some work by day, some by night. There is rumbling clatter in the streets at any hour.

"As if the ordinary odors from such an establishment were not enough, the vehicles include swill carts; when not in use they are left in the sun until their greasy smells grow nauseous. The situation actually taxes belief.

Not Tolerated

"It would not be tolerated, were it in plainer view by the public. The city should lose no time in cleaning out this misapplied corner. Dirt, noise, stench and stable flies are bad neighbors to windward of the commonwealth's most famous hospital. Care for citizens' comfort may well begin with the sick and their closely confined attendants."

Caring for Unconscious Patient

(Continued from Page 1)

Using a flashlight to test pupil reaction is a common practice with unconscious patients. Miss Mary Collins, R.N., demonstrates as Miss Sheila Johnson, R.N., models as patient.

Like the Respiratory Unit, the Neuromedical-Neurosurgical Intensive Care Unit has recorded some remarkable success stories.

One involves a bright and attractive young woman. A graduate student, she has systemic lupus erythematosus, an inflammatory disease of the connective tissue which supports the body. Lupus can also produce other effects. In her case, the disease suddenly ravaged the vessels of her head and she lapsed into unconsciousness.

While "on" a respirator, she was fed by vein and given a variety of medications. Her completely unconscious state hung on for 10 days.

"We kept trying everything," a physician recalls, "but no one gave her much chance to survive."

One day the physician walked into her room and decided to shake her. Apparently she was verging on consciousness.

"She opened her eyes," he said. "Within 24 hours she was talking and two days later, she was sitting up."

Now Married

The young woman recovered from that attack and is now married.

At least two other patients of the unit have walked out of the hospital unscathed after surviving a month's unconsciousness.

Unconsciousness is what separates patients in White 11 from those in most of the hospital's other specialized intensive care units.

Treating unconscious patients is a special art. The nurses must be particularly skilled in evaluating vital signs like the pulse, blood pressure, temperature, response of the pupils and movement of the arms and legs.

When one of those signs changes, the nurse must know what to do herself or whether to summon a physician. She must also know how to turn the patient regularly, feed him, run the respirators and give all sorts of complicated medication.

Medical Problems

About one-third of the patients treated in the unit have medical problems such as Guillain-Barre syndrome or lupus. The remaining two-thirds come under the neurosurgery service.

Included are patients with head injuries and those who have had operations around vital control centers of the brain such as the hypothalamus or the pituitary.

"There are a lot of processes," Dr. Sweet said, "that we normally never have to think about because parts of the brain, like the hypothalamus and pituitary, take care of them automatically. I'm talking about much of the

Mrs. Judy Pagliarulo, R.N., head nurse, left, and Miss Mary Collins, R.N., with ambu bag used for artificial respiration.

Demands Extraordinary Alertness

regulation of temperature, the amount of urine, the regulation of blood volume, the concentrations in the bloodstream of very important electrolytes [nonmetallic electrical conductors] like potassium and chloride.

"In the early period after surgery, many of these functions are carried out imperfectly, and we need to take over and regulate them for the patient until his own regulatory mechanism recovers.

Sudden Changes

"For example, the kidney can be creating normal volumes of urine, say 25 to 30 CC's [cubic centimeters] per hour and suddenly leap to 300 CC's per hour. Unlike the normal person who doesn't put out large volumes unless he takes in large volumes of fluid, the unconscious person presents the problem that his urine output can suddenly rise with little or no fluid intake."

Therefore, the nurse must carefully measure the patient's fluid intake and urine. In case of an imbalance, the physician has to decide whether to change the amount of fluids the patient is getting or to give him a drug to lower the fluid output.

The drug usually given – pitressin – is one normally put out by the pituitary gland of a healthy patient.

"The nurse has to be very much on the alert," Dr. Sweet said. "The electrolyte concentration of such things as sodium or chloride can rise or fall with dramatic swiftness.

"As a result, a person who may be awake or talking may drift into a coma over a period of hours. We must get measurements of electrolytes in the bloodstream because only that tells us whether we need to replace losses of sodium and chloride or withhold sodium and chloride because we have excess.

May Need Fluid

"Or it may mean the patient is dehydrated and needs more fluid to reduce the concentration of sodium and chloride."

Potassium, calcium, and magnesium levels in the blood are also critical.

One of the obvious problems with the unconscious patient is to keep him breathing with the proper regularity and depth.

Otherwise the amount of oxygen in the blood may drop below the necessary amount or the carbon dioxide level may rise above the critical point.

Miss Susan Glizinger, L.P.N., gets medication doctor has prescribed for a patient. Complicated medication is the rule in many diseases involving unconscious patients.

New Unit Receives Patients

The Surgical Intensive Care Unit (October, *MGH News*) received its first patients Nov. 10.

That same day the Rev. Theodore Parker Ferris of Trinity Church, Boston, unveiled a tablet which records that this unit was given in memory of the late Robert H. Stevenson by his wife, Alice-Lee T. Stevenson. Francis C. Gray, President, and Dr. John H. Knowles, General Director, thanked Mrs. Stevenson for making the unit possible.

The Surgical Intensive Care Unit thus becomes the newest of the hospital's specialty ICU's.

Another danger lies in the possibility of a plug of mucus blocking the tube placed in the windpipe to permit air in and to allow the suctioning of secretions. That blockage could also result in too little oxygen reaching the lungs and then the bloodstream.

Too long a period of low oxygen in the brain can prevent a satisfactory recovery.

Trained Nurse Needed

"The trained nurse may spot this in time," Dr. Sweet said.

Recovery of consciousness is not necessarily a guarantee of release from the unit. The physician has to determine if the patient's general condition has gotten him beyond the likelihood of another loss of consciousness.

A change in electrolytes is not the only cause of unconsciousness. Too little blood volume can cause it.

So can poor regulation of the way the body breaks down protein or carbohydrates. Too little blood sugar produces the same result.

All these processes and more are regulated by the normal hypothalamus and other brain mechanisms.

"I can't stress the point too much," Dr. Sweet said. "An astute nurse needs to have the clinical acumen of a well-trained physician to take care of such patients properly or to know when to summon a physician."

(Series to be Continued)

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Researchers Share a Common Concern

(First of a Series)

Researchers all over the country share a common concern these days.

The cause is the threat of reduced federal support for research projects. At its recent meetings the MGH Executive Committee on Research is concentrating its conversation on what it fears is Washington's growing opposition to basic research.

Such investigation seeks to uncover general truths while applied research looks for ways of using that general information to combat disease.

Thus, Sir Alexander Fleming discovered that certain molds harbor a substance that fights bacteria. His basic research on that substance (penicillin) led to research to apply the findings to patient care. The result was the age of the antibiotic.

"Basic research provides the backbone and ideas for applied research," said Dr. Kurt J. Isselbacher, Chairman of the Committee on Research.

"Some might argue that scientific investigation aimed at finding improved ways of treating patients can go on for a time without the stimulus of and new information from fundamental research. Eventually, however, the well of ideas dries up.

"The uniqueness of the MGH is that we have everything going on here. We have the Herman Kalckars, Paul Zamecniks and Jerome Grosses [basic researchers] in close proximity to the investigators who are primarily clinically [patient] oriented.

"Their work influences us because we not only are in touch with them, but we can discuss with them the feasibility of translating their findings to relevant problems in man.

"The fundamental research thus serves as a stimulus. Also, the presence of top-flight basic scientists in our midst who provide constructive criticism is vital to our keeping clinical or applied research at the highest level. Finally, as you might expect, and as happens in numerous instances, the basic scientist and applied scientist often combine their efforts and work together to solve a common problem."

Dr. Isselbacher believes that even having to travel to another part of the same city often is somewhat of a barrier to such cooperation.

Ralph G. Meader, Ph.D., Deputy Director for Research Administration, is very much concerned about threatened reduced support of research.

"I feel any geographic barrier is a handicap," he said. "If I have to make an appointment with a scientist even though it is just to go across town, it is not as easy.

"The proximity of basic and applied investigation is in my opinion what has made research at the MGH so great. There is always something that is going on here that can be picked up and applied."

Discussions by the Executive Committee on Research have also touched upon a potential side effect of the slashing of basic research funds.

"When research funds are cut," Dr. Isselbacher said, "it is not the support of well-established scientists and Nobel Laureates that is reduced but that of the younger investigators who are just attempting to start out in medical research. This is true in spite of the fact that probably many of the advances by scientists are made in their earlier rather than their later years.

"With the handwriting on the wall, the student who graduates from medical school now obviously is thinking more than twice about a future career in research. The resultant failure of younger people to enter the field of research and academic medicine might be viewed as desirable by those who feel new physicians should all go out into the community and practice.

"However, they seem to forget that to train more physicians takes teachers, and medical educators are usually more effective when teaching and research go hand in hand.

"By the time everyone realizes the adverse consequences of the current shortsighted approach by our government, much harm will already have been done to American medicine, a harm which, I fear, will take years to undo."

MGH News

Vol. 29 No. 1 MASSACHUSETTS GENERAL HOSPITAL, BOSTON, MASSACHUSETTS January, 1970

Frolicking Tadpoles: A Key to Disease Secrets?

(Second of a Series on Research)

What makes a salamander grow a new arm if an old one is cut off?

The answer to that question may one day lead to improved treatment or even a cure for rheumatoid arthritis; or even the ability for humans to grow new limbs or organs.

From regrowth in salamanders to cure of disease in humans, the road is long, winding and potholed. Yet indications are strong that the tadpoles and salamanders frolicking in tanks in MGH's Jackson Tower are providing a Rosetta stone that may also one day lead to improved understanding of several diseases.

Certain skin diseases, ulcerations of the eye, destructive ear disorders, bedsores, at least three bone diseases, and possibly invasion of tissues by cancer – all these – may involve processes similar to those which cause resorption of the tadpole's tail.

Scientists at the MGH and other institutions are already taking a new look at those ailments as a result of clues furnished by the basic research at the MGH on tadpoles and salamanders.

Some, perhaps most, of the practical results lie many years away. The fact they are possible, however, stems from man's curiosity about nature and his desire to answer some basic questions bearing no direct relationship to disease.

Aided by grants from the National Institutes of Health and the National Foundation, Dr. Jerome Gross, MGH Biologist and Professor of Medicine at Harvard University, has been studying for years the formation, structure and breakdown of skeleton tissues.

(Continued on Page 4)

Computers Simplify Reading of Lab Reports

Barely legible papers are sprinkled through a file cabinet of the MGH Chemistry Laboratory.

Page after page appears in a variety of ink colors in handwriting that ranges from calligraphy to near hieroglyphics.

These pages serve to remind the Chemistry Laboratory of some of the worst examples of how its test results used to appear to physicians. A week's reports for one patient might have been scattered over 20 or more pages without any semblance of order.

Dr. G. Octo Barnett, Director of the MGH's Laboratory of Computer Science, summed up the way things were:

"In a situation where laboratory tests are becoming an increasingly important part of medical appraisal, it was difficult to find or read the individual lab reports. Each report was isolated from every other. There was no continuity. This scattering made it difficult to appreciate trends in the patient's condition."

A doctor often had to leaf through the record and decipher the sometimes illegible reports for 15 or 20 minutes to review the patient's progress for seven days.

Now a computer has taken over the awesome task of compiling Chemistry Laboratory reports. A week's report for most patients fits one clearly typewritten page.

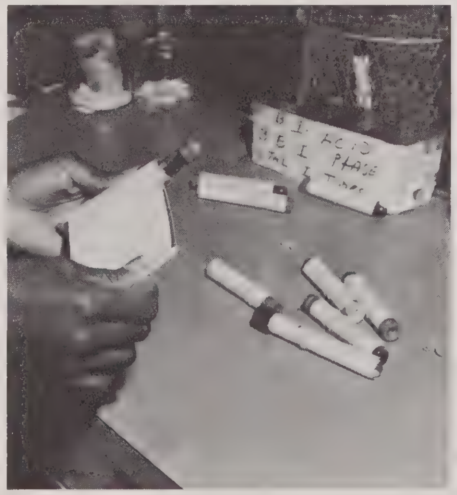
In operation less than two months, the new timesaving system has won praise from physicians and is expected to start a trend in other large hospitals.

"It presents the laboratory results in a much more graphic and clear way than before," one internist commented. Another physician added that, "the doctor can follow the actual progress of the patient day by day and even within the day on one neatly summarized page."

In a way, it was inevitable that the Chemistry Laboratory turned to the computer. The soaring volume of work facing the laboratory has become staggering.

"When I came to the MGH in 1961," Dr. Sidney V. Rieder of the laboratory said, "we did about 800 tests per day. Now we do about 2,400 tests a day. This is really a minimal measure of the growth because of the fact that some of the types of tests we

(Continued on Page 6)



As blood samples come to the Chemistry Laboratory, a technician removes and stamps the requisition, and sends the sample to be processed.

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EDITORIAL:

So Much Achieved, So Short a Career

The 158-year history of the MGH might be thought of as a series of tightly tied strings, each representing pioneering efforts.

A number of those strings have been tied in place by Dr. Fuller Albright. When illness prematurely ended his great career as a scientist and teacher 13 years ago, Dr. Albright had already contributed vast stores of knowledge to endocrinology. His contributions are too numerous to give in detail. Some of the highlights:

- Classical methods for the study of calcium, phosphorus and protein balances and the effects of hormones on them.
- Description of the disease named after him as Albright's syndrome, a condition in which patients have marked bone involvement and characteristic brown spots on their skin.
- The diagnosis and treatment of the disease produced by overactivity of the parathyroid glands.
- Effective treatment of a type of rickets (a bone disease), caused by resistance to vitamin D.
- A technique for treatment of kidney stones.
- A hormonal treatment for certain kinds of uterine hemorrhages.
- The discovery of a kidney disease known as renal tubular acidosis.
- The demonstration that occurrence of thin bones in women after menopause can be effectively treated with female sex hormones.
- Description of development of Cushing's syndrome, his conclusion forming one of the bases for understanding the effects on the body of cortisone and similar drugs.
- The description of pseudohypoparathyroidism, a rare type of disease in which endocrine glands are normal, but the body fails to respond to the hormonal secretions.
- A description of the physiological changes and the dangers of immobilization in Paget's disease, a relatively common bone disease.

Dr. Albright died December 8. His contributions to medicine, however, ended 13 years ago when complications from Parkinson's disease confined his body to a wheelchair and his great mind to an inability to communicate.

He spent those 13 years as a patient in the hospital in which he had carried on his research and which never forgot the debt it owed him. Man can but wonder at the unjust process which marks such an individual for the waste of 13 years. Yet the series of major accomplishments he compressed into his tragically shortened career far eclipse the achievements of most scientists in a normal life span. These accomplishments stand as a monument to his memory.

Letters to the Editor

Dear Editor:

I have been a practicing dentist for the last 35 years, and now my son is a practicing dentist as well. Our chief function in dentistry is reconstruction of the mouth, and of course we use many electronic devices in our work. One of our latest acquisitions is an electro-surg which cuts the gum with minimal bleeding.

After reading the article in the *MGH News* about the dangers involved in electrical equipment, my son and I in both our offices have changed every plug to a three-pronged plug and are personally very grateful to Dr. Bruner for his work in this field and to the *MGH News* for publishing the article about his work.

We both think the *MGH News* is a valuable publication written in layman's language but with very pertinent and helpful information.

Our thanks to you for keeping us informed.

Leonard Simkins, D.D.S.
Philadelphia, Pa.

The *MGH News* welcomes letters from its readers. To avoid condensation, letters should be brief and must be signed. Names will be withheld on request.

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IN MEMORIAM

Endless Curiosity and Challenge of Tradition

Dr. Fuller Albright, renowned endrocrinologist and a legend in his time at the MGH, died December 8 in the hospital that owed him so much.

The *MGH News* reprints excerpts from two articles from the January, 1962, issue of *Metabolism,* which was dedicated to him.

From an introduction by Frederic C. Bartter, M.D., Chief, Clinical Endocrinology Branch, National Heart Institute:

" . . . He taught – he emanated – an attitude toward research that was more contagious than his most attractive theory. The attitude was compounded of curiosity, ceaseless and systematic, on the one hand, and of a remarkable freedom from the 'learned tradition' on the other.

Challenging Old Notions

"We have called his curiosity ceaseless. It seemed to us that, for Fuller, to be awake was to be challenging an old notion (often one of his own) or formulating a new one. It was systematic, because there must be *some* theory. ('Better a theory that is wrong than no theory at all.') As for the learned tradition, it is safe to say he *never* let the voice of authority prematurely stifle a fresh, speculative idea. On one occasion, after a friend had lightly challenged the germ theory of disease, Fuller was unusually silent, and a colleague asked him why. 'I was just wondering whether he might be right,' he replied. His freedom from authority included characteristically his own authority. He loved to formulate a sequence of events that could 'explain' the findings in a complex clinical case. Six months later he might devise for the same case quite a different sequence. If a student pointed out that he was not being consistent, he was unimpressed.

Famous for Humor

"As humor springs from a novel juxtaposition of ideas, it is no accident that Fuller Albright was almost as famous for his humor as he was for his science. A friendly competitor once asked him if he knew the cause of Paget's disease. 'No,' he said, 'but look out, I may think of it any minute.' There was a sublime detachment to Fuller's humor: It was never *ad hominem* and reflected neither concern nor self-consciousness for his own disease, which might easily have become a source of preoccupation in one of lesser courage. Characteristically, he told with delight of the consternation on the face of a man whose car had just collided with his own. The man, seeing the tremor of Fuller's Parkinsonism, well advanced by that time, had asked, 'My God – did I do that?'

"The teaching and investigative life of Fuller Albright, who 'never could get interested in neurologic diseases,' was effectively destroyed by one of them. . . . "

MGH Associate

From the article "In Appreciation: Fuller Albright" by Dr. Anne P. Forbes, Assistant Physician, MGH; Clinical Associate in Medicine, Harvard Medical School:

"So geometric has been progress in medicine that the distance between Richard Bright and William Osler seems smaller than the distance between William Osler and Fuller Albright. The distance between Fuller Albright's first discoveries and his last ones is indeed a great distance in medical history. . . .

" . . . Sometimes he wrote the first paper describing a disease, and at other times he wrote not the first, but merely the best description, pointing out the 'sequence of events' in its pathogenesis. . .

" . . . His life-long associate and colleague, Walter Bauer, said of him, 'No one was more successful than was Fuller in proving that the research of today is often the treatment of tomorrow.' This epitomizes very well Fuller Albright's contribution to medicine.

Luminous Common Sense

"What about the personality of this remarkable investigator under whose luminous common sense so many knotty problems suddenly seemed simple? He never discussed personalities. His private life was uneventfully happy. He came from a wealthy and good family, had the best educational opportunities and took full advantage of them, particularly of his year of classical Viennese pathology with Erdheim. He married Clare Birge and lived happily thereafter in a serene and comfortable home where friends from all over the world were received. What about his heroic battle with his tragic disease? Was it, after all, heroism which made him refuse to stop doing what he liked to do, or was it just more of his famous common sense? His indifference to pity was the indifference of a profoundly serene and happy man to public opinion of any kind. . . .

"Although he was never made to feel dependent on his wife, Fuller could not have continued to work productively without her.

"Perhaps they are both heroes, but they are certainly not martyrs. Martyrs are never so widely loved and respected in their own time."

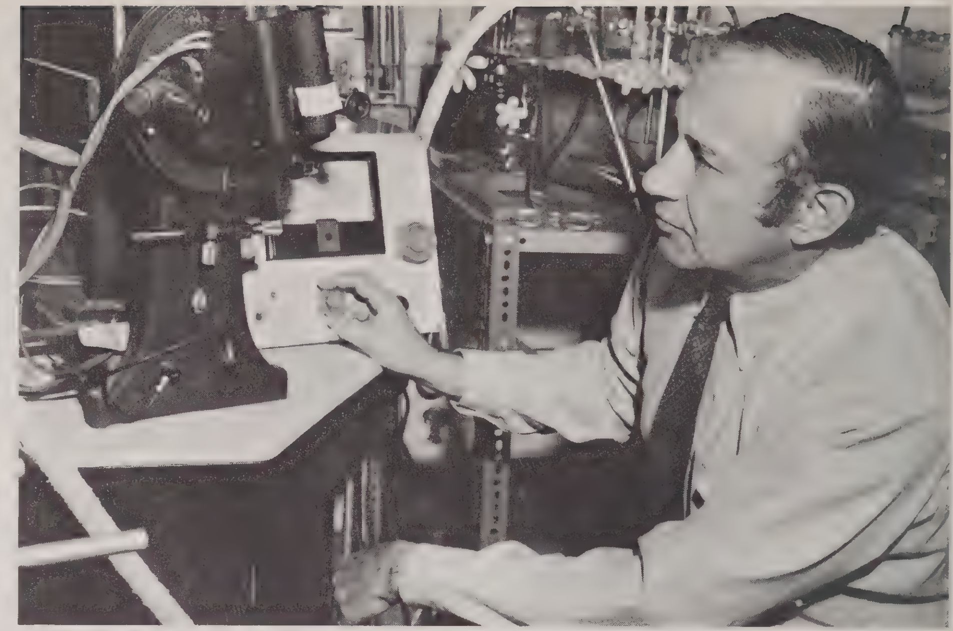
(Photograph taken in 1950's) DR. FULLER ALBRIGHT

Frolicking Tadpoles: A Rosetta Stone?

(Continued from Page 1)

"The specialized problems we have been interested in have to do with regeneration," Dr. Gross said. "A salamander's arms and legs have the same structures as do ours: the same five fingers, muscles, bones, cartilages, joints, nerves, and skin. But if you cut his arm off, he will grow a new one.

"Humans can regenerate part of the liver, hair, skin, nails, bone. The one thing we do have trouble with are structures involving multiple types of tissues. We can scar them over with connective tissues, but not regenerate them."



Dr. Jerome Gross adjusts an instrument for measuring the structure of chemical molecules.

Orderly Growth

Yet nature perfectly meshes the orderly growth of these different structures in the growing embryo. It is easy to show this in the laboratory by mincing an organ such as a kidney into its separate cells.

Left alone long enough, the cells will come together and re-form a kidney structure. Under some circumstances these will even show some signs of functioning. A similar process occurs in the regenerating salamander limb.

The same process, however, fails to occur with a human arm or leg. Instead, cells are destroyed in the area of the amputation. Collagen, the protein that makes up the chief substance of connective tissue, then forms a scar on the end of that limb.

That is the healing process. The scar ends regeneration for most higher animals except for a few like the salamanders.

In this favored animal, cell death in the stump does not result, and a sac grows over it preventing the cells from pouring out.

Cells Float Free

Breakdown begins between cells which then float free. They come together, randomly at first, and then begin to sort out and differentiate into specialized cells like those in new bone and cartilage.

Everything except nerve cells reforms this way, and a sufficient nerve supply must grow into the injured stump for regrowth to take place.

Something obviously has to make it possible for the cells to separate from each other before regrouping. Dr. Gross and his group theorized that this special something is an enzyme which can break down collagen, the substance between cells. Enzymes are substances which can break down molecules or build them up.

An unlikely looking creature to be a possible key to better understanding of several diseases, this salamander is a resident of Dr. Jerome Gross's laboratory.

To find the enzymes involved in breaking down the substances between cells, the group turned to the tail of the bullfrog tadpole.

Normal Loss

They sped the normal loss of the tadpole's tail by injecting a thyroid hormone. In nature, thyroid hormone is responsible for transformation from a tadpole to a frog. Given artificially in addition, the hormone greatly speeds the process.

"We couldn't find the enzymes by extracting tissues the usual way," Dr. Gross said. "We guessed that these enzymes are made when and where they are needed, and released and gone all in a very subtle way.

"We thought the best way to collect them is in tissue culture [tissue cells in a medium or substance conducive to their growth]. The enzyme would be released into the culture medium and would build up in high enough quantities to observe its effects."

The technique worked. Dr. Gross's group was able to observe collagenase, the enzyme which breaks down collagen, the main supportive protein of skin, tendon, bone, cartilage and connective tissue. The MGH researchers learned how collagenase was able to break down collagen, and how it holds collagen growth in check.

They then returned to amputated salamander limbs. The group's patience was rewarded. At the stage in which cells sorted themselves out in specialized groups such as bone, the scientists found the collagenase appears at the time and place predicted, when and where cells are separating from each other.

Worked Out Method

In the process, they had worked out a method to: 1. Detect collagenase. 2. Isolate and analyze it. 3. Determine the way it acts in collagen. 4. Study its response to hormones and disease processes.

Now Dr. Gross's group is also working on the detailed structure of the building blocks that make up the collagen molecule. They are trying to map the order in which these building blocks, the amino acids, are arranged in the molecule.

It is possible that errors in this sequence may be at least partly responsible for some birth defects, for the crippling results of rheumatic diseases and possibly even some of the changes in aging.

"There is little doubt," Dr. Gross has written in *Scientific American,* "that severe crippling deformities of bones and joints, and the scarring of the heart, kidneys, blood vessels, lungs and other organs, are a manifestation of excessive production and aberrant arrangement of collagen in the affected tissues.

"It is characteristic of medicine that frontal attacks on problems such as these seldom yield quick results. There is every reason to hope, however, that studying collagen at the fundamental level of molecular structure will lead ultimately to knowledge that can be applied in medicine."

Rheumatoid Arthritis: Search for a Cause

Rheumatoid arthritis is a crippling disease which strikes millions of Americans.

An MGH group headed by Dr. Stephen M. Krane has for years been striving to find out what the rheumatoid process involves.

In another MGH laboratory, a research group headed by Dr. Jerome Gross has for years been studying the regrowth of limbs by salamanders and tadpoles.

The proximity of the two laboratories produced a fortunate result. Because of the frequent exchange of ideas among scientists at the hospital, Dr. Krane was aware of research by Dr. Gross that might help in his own completely unrelated work.

Dr. Gross's group was able to identify a collagenase, an enzyme which breaks down collagen (see story on page 1). A protein, collagen is abundant in connective tissue such as bone, cartilage, tendon, ligament and skin.

Dr. Krane's group wondered whether they could detect collagenase in the synovial membrane, the structure that lines the joint. While at the MGH during 1966-67 on a British Medical Research Council Fellowship, Dr. John M. Evanson of the Manchester (England) Royal Infirmary obtained fragments of synovial membrane at the time of synovectomy, an operation performed in an attempt to prevent damage to the rheumatoid joint.

He placed them in a culture the way Dr. Gross had done with tadpole skin. Dr. Evanson succeeded in finding collagenase in the cultures of synovial membranes from patients with rheumatoid arthritis. It behaved much like the tadpole collagenase.

Dr. Stephen M. Krane (right) and Dr. Edward D. Harris, Jr., examine a culture.

More recently, another staff member of the Arthritis Unit, Dr. Edward D. Harris, Jr., tried to find collagenase in the synovial fluid itself. He did. What's more, the collagenase in the living situation worked just the same as the same enzyme did in the culture.

Dr. Harris and Dr. Krane then looked for collagenase in the cultures of synovial membranes from patients with joint diseases other than rheumatoid arthritis.

"We have found significant enzyme produced in culture in only one instance," Dr. Krane said, "although small amounts may be produced in patients with other inflammatory arthritis. The production of collagenase thus may be a handle for recognizing the rheumatoid process, since membrane from rheumatoid patients always produces the enzyme in culture."

Dr. Krane, therefore, theorizes that the destruction that goes on in the joints of rheumatoid arthritics is related to the production of collagenase.

The MGH Physician and Harvard Medical School Associate Professor of Medicine has a further clue.

"In normal synovial fluid," he said, "are proteins that come mostly from blood serum that inhibit the [destructive] action of the collagenase.

"It appears that the synovial fluid of patients with rheumatoid arthritis is less inhibitory than in patients with a normal joint.

"This has enabled us to think of some ways in which the activity of the enzyme might be inhibited in persons with the disease."

In many patients with rheumatoid arthritis the inflamed synovial membrane is continuously produced.

With Drs. Martin Hirsch, a Clinical and Research Fellow in Medicine, and Paul H. Black, Assistant Physician at the MGH and Assistant Professor of Medicine at Harvard Medical School, Drs. Krane and Harris are seeking the mechanism in these membranes which allows them to continue this process.

"If our studies give us a clue as to what causes rheumatoid arthritis in the first place," Dr. Krane summed up, "we would hope to use that information in an attempt to find a cure for this disease."

(*Series to be Continued*)

Computers Simplify Lab Report Reading

(Continued from Page 1)

used to do are now performed in other laboratories in the hospital."

More recently, the work load in the laboratory has been increasing by 15 percent per year. Even the new quarters in the Gray Building would not long have contained the large number of personnel required to cope with the rising flood of demands.

"On top of this," Dr. Rieder said, "there is a scarcity of personnel who can be hired to handle all this data."

Dr. Rieder listed several reasons for the swelling number of tests ordered by physicians. One is the growing number of intensive care units at the hospital (note series on specialized intensive care units concluding in this issue of the *MGH News*). The very sick patients occupying these units require a wide variety of frequent tests.

Different Types

Another reason is that more and more different types of tests are being developed. Still another is that physicians are becoming increasingly test conscious.

Faced with the resulting demands, Dr. Rieder felt that automation of the data-processing activities was essential and turned to the Laboratory of Computer Science. The laboratory has a three-year $1½ million National Institutes of Health grant to support the research and development required to introduce the computer into patient care.

The Laboratory of Computer Science agreed that the use of computers in the laboratory test reporting activity would be a good area for development. The objectives were clear; the need was obvious; and the computer program could be introduced in a step-by-step fashion. Computerizing the Chemistry Laboratory reports is particularly important because it is a critical part of the patient-care process that involves the entire hospital.

The development of the computer system was the joint project of a team of computer engineers from the Laboratory of Computer Science, headed by Dr. Robert Greenes and James Poitras.

Martha Blarr weighs blood samples to balance the centrifuge in which the serum will be separated from the red blood cells.

People who tend to be skeptical about computer operations expected all sorts of problems when the new system began last November.

"The transition proved remarkably smooth," Dr. Rieder said. "One day we were using the old method and the next day, the new. There have been very few bugs, and we are very delighted with what has transpired. The doctors think it is great."

When a physician decides to order a test, the procedure begins the old way. He fills out a requisition order at the patient's nursing unit.

An intravenous nurse picks up the order and draws a tube of blood from the patient. The Dispatch Service takes the tube and the requisition to the Chemistry Laboratory where a technician stamps the requisition and carries it to one of several teletypewriters in the laboratory. The teletypewriters are used to enter the information into the computer.

A clerk then types what tests are ordered, and the computer housed in the Thayer Building records the data. The computer assigns a specimen number to that order and tells how many tubes to divide the blood among.

By means of a device called a centrifuge, the technician separates the red cells of the blood from the liquid portion called the serum. It is the serum that is most often used for the studies. The computer produces different sheets that list all specimens for which a given test has been requested. The chemist then uses this list as the work sheet. Picking out the one that describes what has to be done for a given test, the technician follows those instructions. Some tests are done automatically, others manually.

Program Being Developed

At this point, the technicians have to calculate the results of the tests. A computer program is being developed to perform the calculations and put the answers directly into the patient's file.

For the time being, the manually calculated answers are given to a clerk who types them into the computer.

Taking reports from all the patients, the computer stores them. Each afternoon it prints out the Chemistry Laboratory test results for all the patients in the hospital.

At the same time, the computer summarizes on the page all previous test results for that week for a given patient.

The computer prints such pages floor by floor for every patient in the hospital. This systematic method makes it easy to deliver the pages in turn to each patient care unit.

Results Available

All results available at the laboratory at 3 p.m. become available to the physician making his 5 o'clock rounds. The complete results for the day are printed and distributed by 7 or 8 p.m.

When the laboratory has an emergency order, a red tape placed across the requisition assures speedy handling. A teletype receiver in the Emergency Ward gets an automatic printout every half hour of all tests ordered for its patients that day.

The computer prints out results for all outpatients as well as inpatients.

Much of the work already being done by the computer is the boring, repetitious type which consumes time that could be spent more efficiently.

"People don't do that sort of work well," Dr. Barnett said, "but computers do." The computer, with its built-in safeguards, avoids the errors that bored humans make.

It is too early to tell how effective the computer system will prove in other ways.

Hope to Avoid Duplicates

"We hope," Dr. Barnett said, "to decrease the number of laboratory tests on patients by preventing needless duplications. Sometimes doctors used to reorder a test because they missed it on the patient's report. This is particularly true in a teaching hospital when a number of different doctors have responsibility for the care of a particular patient. One doctor may not realize that another doctor has already ordered a given test.

"The new system also makes it possible to study how the doctors are using the laboratory. This information is useful for both the administration and the Utilization Review Committee, and is particularly important in regard to the issue of hospital costs."

At this point Dr. Barnett estimates an additional 10 cents per test is required to support the computer activity. Some of this added cost may be offset by the savings from not having to hire additional personnel.

Reduction of Stay

In addition, speedier, better organized test results could reduce slightly a patient's stay. Even the reduction of a fraction of a day per patient could mean a savings of millions of dollars a year.

"Computerizing the Chemistry Laboratory is the first of a set of building blocks to the development of a computer-based medical record and clinical data management system," Dr. Barnett said. "Gradually the computer will be used more and more to help the doctor care for the patient.

"The laboratory reporting activity will be extended to the bacteriological laboratory, and a research effort has been initiated to extend it to radiology [X rays]. The basic aim is to make medical care better, and to remove some of the time-consuming, tedious paper work from the hospital staff."

A Change of Attitude: From Despair to Hope

(Continued from Page 8)

ple working there to make certain they do not harbor dangerous germs.

Regulating Dosage

Transplant patients are particularly susceptible to infection because of the large amount of immunosuppressive drugs they receive. These are drugs that tend to suppress the body's natural attempt to fight off a strange organ.

Regulating the dosage is still one of the gravest problems facing the transplant team. Too much lowers the body's natural resistance to infection.

Too small a dosage of immunosuppressives increases the threat that the body will reject the transplant.

One early hope was a substance called antilymphocyte serum. In theory, ALS tends to fight rejection of the new organ while doing less to knock out the infection-fighting mechanism.

"So far," Dr. Russell said, "ALS has not fulfilled its promise, but we have hopes that some new approaches we are trying will be much more effective."

Yet, despite all the hazards, kidney transplant patients are doing better than ever before.

Chances Improve

Because of the decreased likelihood of rejection, living, related donors now offer the kidney recipient a 90 percent chance of surviving at least one year after a transplant. The MGH's record with cadaver donors has recently been somewhat better than the world average of 45 percent survival of one year or more.

"We're using more and more non-living donors," Dr. Russell said, "even though the success rate is not as good."

There are two major reasons for that policy. First, living donors face a slight risk that something might happen to their remaining kidney.

Second, the added risk of failure would not prove fatal. Even if the original transplant fails, another one may prove successful.

The MGH has now done about 70 kidney transplants. Its longest survivor is a Milwaukee man operated on in April of 1963.

Normal Life

A brother gave him the kidney that has enabled him to live a normal life and sire two children since the operation.

Another of the early patients is Otto Kaltofen, who works in the MGH Accounting Department.

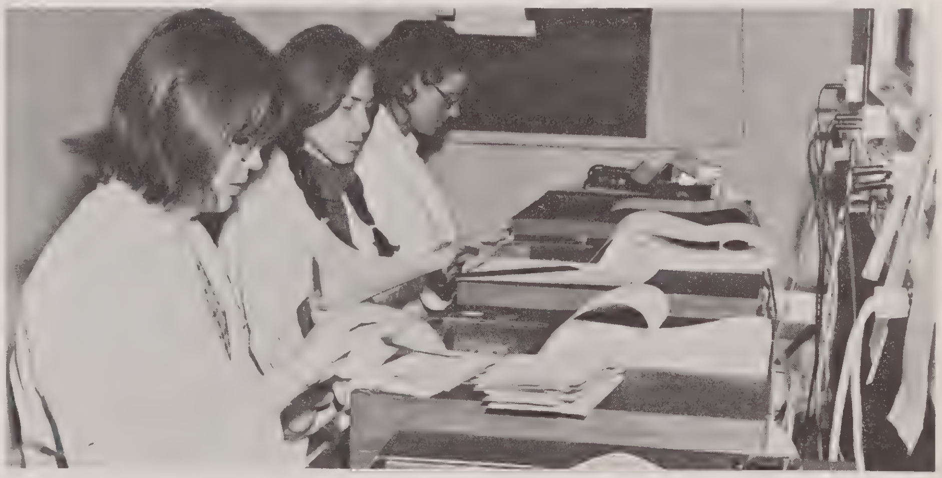
Before receiving his brother's kidney on Nov. 3, 1965, he seemed unlikely to live many months. Now he is pursuing a hobby of flying gliders.

Like Jim, who was described earlier in this article, many of the successful transplant patients believe they have a new lease on life.

"One recent recipient had been so withdrawn before surgery, he hardly spoke," Miss Towne said. "He is only 18 years old and had never been able to stretch his mind to the future.

"Now he has decided he would like to be a carpenter. He is able to project into the future and know there is a reasonable chance there will be one."

(End of Series on Specialized Intensive Care Units)



Teletypewriters are the Chemistry Laboratory's link with a computer of the Laboratory of Computer Science. Juanita Kent, Linda Davis and Jeannie Bottari type the information on test results into the computer.

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A Change of Attitude: From Despair to Hope

(Last of a Series of Eight Articles)

Jim had been awaiting a kidney transplant for about two months.

One dull Sunday last November, he was sitting in the kitchen chatting with his father when the telephone jangled. It was the MGH. Surgeons had a "compatible" donor kidney.

Jim's brother drove him through the rain-whipped Boston streets to the hospital. As the car turned onto North Grove Street, Jim glanced up at the light-stoned tower of the White Building and said a silent prayer.

It was on the 12th floor of that tower in the Transplant Unit that he awoke the next morning with a new kidney. He never learned the name of the man whose death the day before made the transplant possible.

Rapid Progress

Physically, Jim made rapid progress. He walked the day after the transplant.

Psychologically, he suffered some of the problems that initially face many persons who receive a donated organ.

"I had a few bad dreams two or three nights in a row," he recalls. "I thought that maybe my new kidney wouldn't function.

"I had a strong feeling that I had a part of another man's body; a man that I didn't even know.

"One day I lay in bed, and I tried to visualize the kind of a person whose kidney I had. First I felt a little guilty because I was taking it from him.

"Gift From Family"

"Then I realized it was a gift from his family. But every once in a while I think of it as a foreign body, and if I treat it all right, it will probably stay with me and do all right. My attitude changed from a kind of despair to one of new hope. It's just like starting a new life."

Dr. Harry Olin, a psychiatrist working with the Transplant Unit, headed by Dr. Paul S. Russell, Chief of Transplants, helped Jim over the emotionally critical days.

Dr. Olin even came in on Sunday to encourage Jim and watch part of the operation.

The emotional problems begin with the realization that a transplant is needed to stay alive. Jim's reaction to the news had been fairly typical.

"I automatically started thinking of death."

The long wait often required before someone donates a compatible kidney adds to the burden.

Must Remain Isolated

After the transplant, the patient must remain isolated from visitors for long periods, because of the danger of infection. The lengthy isolation tends to heighten anxiety.

"Some male patients worry that they have a female kidney," Dr. Russell said. "Some females worry that they have a male kidney.

"Some patients feel they have a special debt to a living donor. Some donors feel they own the patient."

Besides the psychiatrist, the unit benefits from the services of student clergymen, a psychiatric nurse clinician, and a social worker.

Obviously, psychiatric problems are not the only ones facing the transplant patient.

Danger Greatest

"In the early period after the transplant," Dr. Russell said, "the danger of infection is the greatest."

Isolating the patient in one of the two single rooms in the unit is one means of guarding against infection. The nurses there under Miss Cathryn Towne, R.N., are especially trained to guard against infection.

Infectious Disease Unit members of the transplant team constantly monitor White 12.

They culture the throats of the peo-

(Continued on Page 7)

In November of 1965, Otto Kaltofen was a patient in one of the MGH's specialized Intensive Care Units, the Transplant Unit, after a kidney transplant. He works in the hospital's Accounting Department.

MGH
News

Vol. 29 No. 2 MASSACHUSETTS GENERAL HOSPITAL, BOSTON, MASSACHUSETTS February, 1970

Occupational Disease: A Problem That Lingers

On September 1, 1945, her superior in the Department of Labor deposited a large file on Dr. Harriet L. Hardy's desk.

"Give this your whole attention, until the problem is solved," he said.

The folder was the information collected to that point on the illness of Massachusetts fluorescent lamp workers. And the study of this illness initiated for Dr. Hardy a crusade against occupational disease. In 1970, she is still wrapped up in it.

Job-related illness has been recognized at least since 1713 when Bernardo Ramazzini published a book on the hazards of 52 occupations – including wrestling, gravedigging and nursing. Legislative action and social reform started in the nineteenth century when the dangers to chimney sweeps and the women and children working in English mines aroused the public concern.

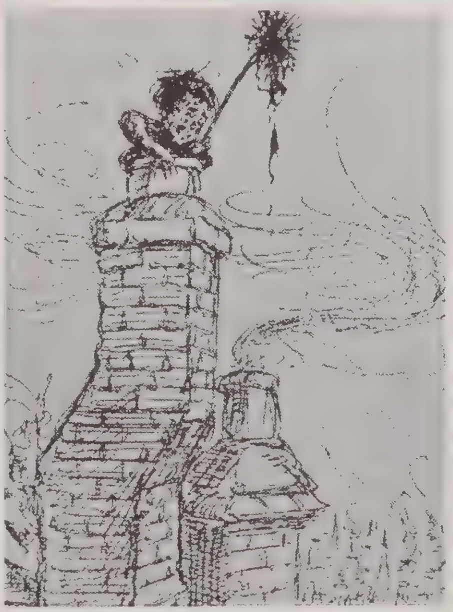
The United States has been somewhat behind Europe in correcting conditions hazardous to workers. In the 1920's, however, the dangers to luminous watch-dial painters, who pointed their brushes with their lips, caught the popular interest.

Since then, the situation has improved. "Many industries seek excellent medical and engineering advice and use it to control hazardous jobs," Dr. Hardy said. "Workmen's compensation statutes and state health and safety laws have caused great improvements in working conditions."

Dr. Hardy finds that there is still room for much more improvement, however:

"With the excitement over the dan-

(Continued on Page 4)



Social reform in England ended the practice of endangering the health of small children by using them to sweep soot from chimneys. This drawing was an illustration to an essay by Charles Lamb.

"Strange Growth" Turns Out to Be Just That

(Third of a Series on Research)

One day early in 1937 a technician showed Dr. Louis Dienes a culture dense with tiny colonies of growths.

"Dr. Dienes," Technician Marguerite E. Burke said, "there is a very strange growth here."

No bacteria were visible with the microscope. Dr. Dienes examined the culture with a special staining technique that revealed the nature of the tiny colonies. The mysterious growth was Mycoplasma.

Dr. Dienes chuckled as he recalled the irony of that day. The MGH bacteriologist was one of several scientists from all over the world who had spent years unsuccessfully hunting for that elusive organism in man.

"After all that searching I found it accidentally," he said. This is often true of important research discoveries.

French investigators had spotted Mycoplasma in cultures from an epidemic of cattle in 1898. Since it became evident that these organisms could cause serious disease in animals, scientists had searched for them unsuccessfully in humans.

In the 1930's an English researcher made some progress toward unlocking some of the organism's secrets. However, it remained for Dr. Dienes' chance discovery to find Mycoplasma in man.

The culture which his technician showed him came from a pus-filled gland (Bartholin's) that Dr. Langdon Parsons had removed from a patient. Dr. Parsons himself had cultured it looking for a common bacterium and turned the culture over to Dr. Dienes for study.

Later, Dr. Dienes also found Mycoplasma in cultures made from the mouth. No evidence has ever turned up of disease caused by Mycoplasma in the mouth.

Those organisms he discovered in the urinary tract area, however, can produce cystitis, an inflammation of the urinary bladder, and pyelitis, an inflammation of the kidney's basin-like structure called the renal pelvis.

(Continued on Page 2)

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EDITORIAL:

Lost in a Cloud of Pollution?

The days may be gone when children develop disease from cleaning soot-clogged chimneys, but disease caused by occupational exposure is still very much a reality.

As should be expected, things are not as bad as they were at the turn of the century. Just a few weeks ago Congress passed a bill setting safety and health standards in the coal mining industry. Such a law was long overdue. But over the years technology has brought with it safety precautions and devices in a variety of industries. It is also important that compensation has become available for accidents on the job. In contrast with accidents, however, diseases incurred by contact with harmful substances are far from adequately covered.

As a story on page 1 points out, the laws themselves, as well as the practical operation, are partially to blame. Few states require the reporting of diagnosed occupational diseases, so the extent, even of a serious concentration of job-related illness, may go undetected and uncorrected.

Some state laws do not allow for the delayed onset of some diseases, limiting compensation to only those cases which occur up to three years after exposure. In other states, compensation becomes available only when a disease appears on a list of established illnesses. This ignores the possibility of a new substance in our ever-innovating industries proving to be detrimental to workers' health.

Once occupational disease is suspected, industry's adherence to trade secrecy and its reluctance to cooperate with investigation for fear of court and compensation costs make the doctor's already difficult diagnosis even more so. Once in court, the power, personnel and time wielded by large industry can make obtaining compensation a great hardship for the individual worker and his doctor.

Although diminished by comparison with 70 years ago, the problem of occupational disease clearly remains. The very fact that it took until 1969 to get a reasonably adequate mine safety bill through Congress is indicative of the power that big industry exhibits in warding off constructive reform. And with the growing alarm about pollution, the issue of the health of individual industrial workers will be crowded into the background. This is understandable. Certainly pollution has become a grave problem that threatens the very existence of mankind. Beside it, the issue of the health of individual workers looks small. Yet occupational disease still strikes thousands of people and presents a problem that humanity should not lose sight of in the much larger cloud of pollution.

"Strange Growth" Proves Just That

(Continued from Page 1)

When antibiotics came into use in the 1940's, both of those diseases became curable. It was found that streptomycin wiped out the Mycoplasma-caused infection in a few days.

Dr. Dienes related the dramatic case of a man with cystitis who had been discharged from the Army.

"He was made an invalid by the disease. He went to a number of hospitals, and they had been unable to do anything for him.

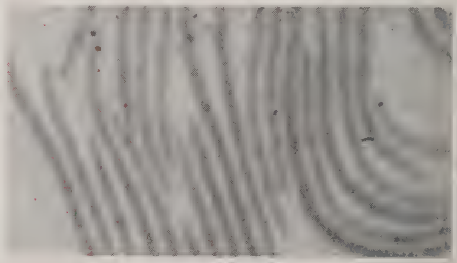
Role in Abortion

"The patient was then admitted to the MGH, treated with streptomycin and cured in two days."

One species of Mycoplasma was discovered by Dr. Monroe D. Eaton of Harvard Medical School to be the cause of primary atypical pneumonia.

More than 30 years after Dr. Dienes' discovery, there are no other human diseases, besides the above, known to be caused by Mycoplasma. But there are other possibilities.

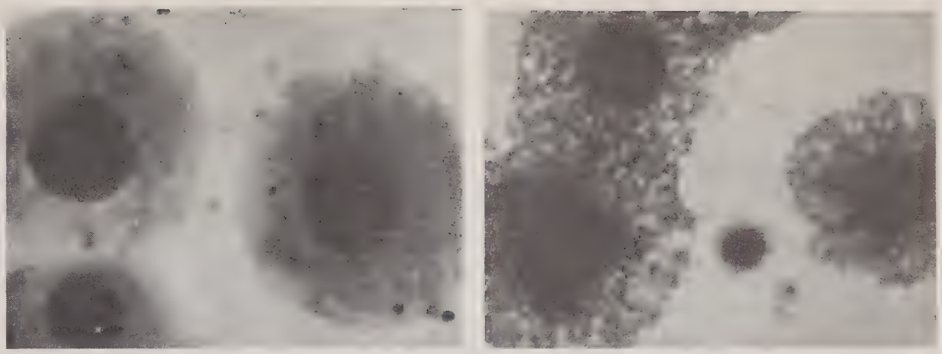
Recent work by Ruth B. Kundsin, S.D., of Harvard Medical School and



Rod-shaped bacteria.

The *MGH News* welcomes letters from its readers. To avoid condensation, letters should be brief and must be signed. Names will be withheld on request.

With its February issue the circulation of the *MGH News* increases to about 60,000. The expanded list of subscribers is being computerized. The operation is a complicated one and undoubtedly mistakes will be made in the initial months. Your patience and understanding are appreciated.



Mycoplasma colony in photograph on left shows characteristic "fried egg" appearance. L-form of bacteria appears on right. Note resemblance to Mycoplasma. Dr. Dienes took both photographs.

Peter Bent Brigham Hospital, shows that Mycoplasma may play a role in natural (spontaneous) abortion in some women. Two such women, each with a history of six prior spontaneous abortions, gave birth to normal children after treatment with antibiotics.

There is some highly debatable evidence that the organism may cause or at least play a role in one kind of arthritis. Mycoplasma is known to cause severe arthritis in various animals.

The same organism is often found together with other bacteria in pus-producing conditions. Even if Mycoplasma plays a role in causing them, investigators have been unable to expose this role.

Now researchers are finding that the same ubiquitous organism may cause plant disease.

In a strict sense, Mycoplasma is not a bacterium. It is unique in that it lies midway between bacteria and the viruses in many respects.

Resembles L-Form

What Mycoplasma most resembles is the L-form, another mysterious organism which Dr. Dienes has been studying for more than 30 years. At first scientists confused Mycoplasma and L-forms, so similar are they.

Dr. Dienes was able to prove that apparently unlike Mycoplasmas, L-forms come from bacteria that have suffered an injury to the cell wall.

"Under certain circumstances," he said, "L-forms may resume bacterial forms. They grow a new skin, as it were."

Exciting Leads

Despite their name, L-forms come in a variety of shapes and structures. Many of them, however, have a shape, size and fine structure much like the Mycoplasma.

At present, though, scientists have been unable to produce evidence that L-forms take part in human infections.

Yet investigators are coming up with some exciting, though puzzling, leads. They are finding that in several infectious diseases, bacteria are altered in such a way that they look like L-forms – even though they are not.

Scientists under Dr. Dienes, and in other laboratories, are continuing to follow such leads.

Besides its basic research, Dr. Dienes' laboratory examines cultures from patients for suspected Mycoplasma infection. A permanent fixture at the MGH, the laboratory has also become an early-warning center for Mycoplasma detection. Mycoplasmas have a nasty habit of turning up in tissue cultures used in all kinds of experiments. In no time at all, they ruin the cultures and set back a research project months or even years.

Many investigators routinely send their tissue cultures to Dr. Dienes' laboratory for Mycoplasma detection. Should the organism turn up, the laboratory can check its growth before it delays research for many months.

DR. LOUIS DIENES

Two of Hospital Laboratories Were Over Ambulance Shed

A kindly man with a white mustache and a warm smile, Dr. Dienes came to the MGH as Bacteriologist in 1930.

He had worked in another area of research and made valuable contributions to the study of tuberculin hypersensitivity.

"Laboratories were far less elaborate then," Dr. Dienes recalled. "The pathology and bacteriology laboratories were situated over the ambulance shed.

"Only seven people worked in pathology at that time, and two in bacteriology, but the department already had an international reputation due to the work of Dr. James Homer Wright and Dr. Tracy B. Mallory."

Workers Who Contract Occupationa

(*Continued from Page 1*)

gers of radiation and the current focus on air and water pollution, the attention and funds for research have been drawn away from job-related diseases." In addition, most unions, until recently, have not been interested in the prevention of occupational diseases.

"They would rather have the job declared hazardous, and have the worker receive more pay for doing it," Dr. Hardy said.

Dr. Hardy contributed to the MGH's tradition of attention to occupational diseases when she opened an Occupational Medical Clinic in 1947. Dr. David L. Edsall, who later became Dean of Harvard Medical School, had pioneered with an Industrial Clinic at the MGH in 1912. Dr. Joseph Aub, by active study of lead poisoning during the 1920's, kept lively MGH's attention to industrial disease. Dr. Wade Wright and others continued an Industrial Medical Clinic, and in 1947, Dr. Hardy, with encouragement from the late Dr. J. H. Means and Dr. Rulon Rawson, revived interest in occupational illness.

Research funds made it possible to "study the mechanism of disease production following toxic work exposure." Disease entities studied in detail include cyanide, beryllium and tetryl poisoning, asbestosis and respiratory disease of coal miners. Dr. John Stoeckle, Associate Physician and Chief of the Medical Clinic, has worked with Dr. Hardy on these subjects since the early 1950's.

Correct diagnosis of work-related illness is very important, and "rarely easy," Dr. Hardy pointed out.

"The body has a limited number of ways of reacting to numerous insults," and a complete, detailed occupational history is necessary to pin down the cause.

Cause Obscure

"In certain cases the true cause may remain obscure because it is not possible to get accurate knowledge of how much of what potentially harmful material the subject was exposed to. However, in the majority of cases, if the physician knows what questions to ask and where to turn if the worker is ignorant of his work exposures, the correct diagnosis can be made.

"What is needed is the knowledge of the quality and the quantity of material taken into the body and the method of exposure.

Most Materials Inhaled

"Most materials causing disease are inhaled, but the gastrointestinal tract and the skin are occasionally important. Radium poisoning in luminous dial painters is an example of the former. Certain organic phosphates used for pesticides present unusual hazards because of the ability to penetrate unbroken skin."

Among other hazards causing occupational pulmonary disease are vegetable and mineral dusts. Especially dangerous substances are silica, asbestos, such chemicals as sulfur dioxide and chlorine, and certain metals such as cadmium.

Asbestos, nickel, certain chromates and ionizing radiation may produce cancer.

In obtaining a history of jobs, it is necessary to include all jobs ever held, because latency creates a problem. Sometimes symptoms do not develop until up to 20 years after exposure, Dr. Hardy said. Another difficulty is created because "intense exposure for short periods causes reactions entirely different from those due to low-level exposures for long periods."

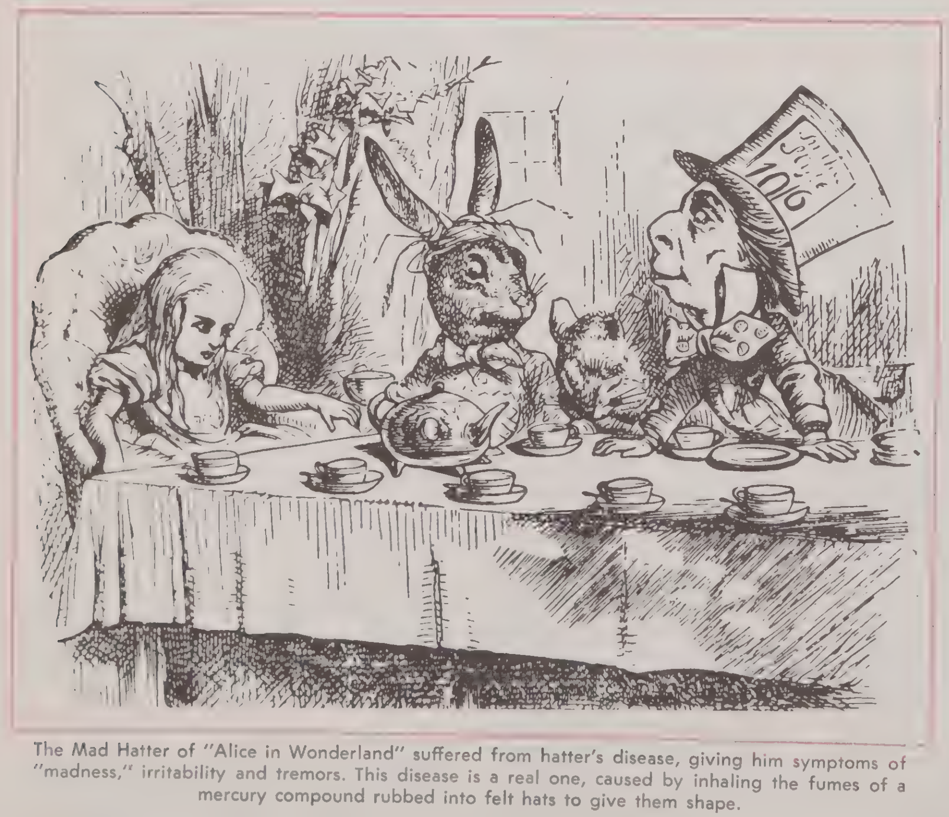
Identification Essential

Identification of the materials used is essential, because "the body reacts so differently to compounds chemically alike.

"The physician may learn the quantity of exposure by recording the character of the work, its duration and its intensity. For example, noting the heat involved or the requirement of unusually heavy labor that would result in a larger dose might explain illness in one worker rather than another in the same workroom."

Also, information about factors like the type of ventilation and protective devices help fit together the puzzle of cause.

There are obstacles to obtaining the correct knowledge. Industries are often



The Mad Hatter of "Alice in Wonderland" suffered from hatter's disease, giving him symptoms of "madness," irritability and tremors. This disease is a real one, caused by inhaling the fumes of a mercury compound rubbed into felt hats to give them shape.

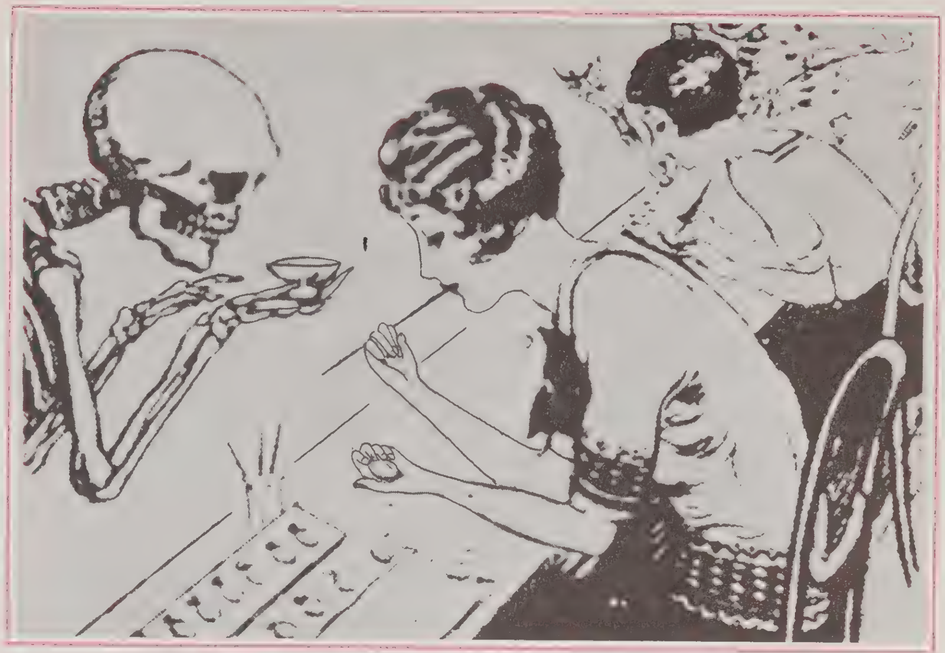
(Illustrations accompanying this story from Dr. Donald Hunter's "The Diseases of Occupations," used courtesy of Little, Brown and Company.)

Diseases Face a Variety of Obstacles

reluctant to disclose exactly what materials are used because of trade secrecy. They are hesitant to cooperate with investigation of their operation for fear of compensation costs.

The laws involving occupational disease are in many states inadequate or poorly enforced. In only a few states is the reporting of diagnosed job-related disease required. In some states compensation is allowed only when the illness occurs within three years after exposure, or if the disease is mentioned on a list. This does not allow for delayed onset of some of the diseases.

"The Massachusetts law is well written," Dr. Hardy observed. "Accidents caused on the job are well handled. It is a good law, but operates poorly for the worker with industrial disease, causing him much hardship."



The hazards to luminous dial painters who pointed their brushes with their lips aroused public concern during the 1920's. This cartoon showing Death holding a dish of mesothorium paint appeared in a New York newspaper.

Massachusetts Law

The Massachusetts law allows for compensation if the disease can be shown to be job-related. The opinion of physicians qualified by experience as experts in the field is usually sufficient. However, Dr. Hardy said good doctors dislike going to court to testify because of the wasted time and red tape. Large industries can afford lawyers, court costs and time better than the individual workman trying to get compensation.

Continuing problems in industrial health are lead poisoning, lung disease from underground mining, irritation as a result of inhaling a chemical substance used in making crash pads for automobiles, silica and asbestos. Enzyme-active household detergents have recently come under study, due to an asthma-like reaction of some factory workers.

Dr. Hardy, now Associate Physician, has been with the MGH since 1940, but has shared her energies for the fight against occupational diseases with several other agencies. She learned her trade working with the Massachusetts Division of Occupational Hygiene and the Atomic Energy Commission at Los Alamos Scientific Laboratory in New Mexico.

Outside MGH

Currently, in addition to her MGH position, Dr. Hardy is Lecturer on Medicine at Harvard Medical School and Assistant Medical Director in charge of the Occupational Medical Service of the Medical Department at M.I.T.

Recently she joined the MGH Pulmonary Unit, where, as a resource in her ceaseless drive to interest young doctors in occupational diseases and their correct diagnosis, she is trying to "infiltrate the ranks of house officers and fellows."

Respiratory disease of coal miners has long been recognized as a serious occupational disease.

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Foreign Doctors Use Two Routes to MGH

(First of Two-Part Series)

The MGH has been described as a catch basin for the brain drain.

At any one time there are 110 to 140 foreign physicians, laboratory technicians, physical therapists and other medical personnel at the hospital.

In 1968, physicians from 34 countries lent a cosmopolitan atmosphere to the 28 hospital departments in which they worked. The largest concentration of this foreign talent was in the surgery department with 20 doctors. Medicine had 10, and anesthesia, 9. The United Kingdom contributed the most, but there were also sizable numbers from Japan, Canada, Germany and Switzerland.

In many cases, the "brain drain" by the MGH is not permanent, because almost three-quarters of the hospital's foreign doctors are on exchange programs and return to their countries after a few years, according to Miss Anne Cooke, registrar.

Able to Pick

In the view of Dr. Charles L. Clay, this hospital, unlike many other American hospitals, does not need the foreign doctors to fill otherwise empty spaces on the house staff.

This hospital is able to pick its house staff from the top candidates in this country. Dr. Clay said, "The MGH also has an elite group from which to select its foreign doctors and is in a position to be choosy."

Dr. Clay, retired assistant director of the MGH, has dealt for many years with the problems and legal technicalities of doctors from other countries coming here.

Being able to choose the best of the pool of foreign doctors gives the MGH a somewhat atypical group of high-caliber physicians from other countries. There are, for example, about 10 Fulbright scholars here with dual appointments at Harvard Medical School.

Why Come?

Why do foreign doctors come to the MGH?

Doctors here are in many cases responsible for attracting the foreign talent. Professors in other countries who are acquainted with widely known doctors here will sometimes send an outstanding student to study under the MGH doctor. Or a foreign doctor who has served here himself will recommend someone from his medical school. The international reputation of the hospital also attracts foreign graduates who have no connections.

Sometimes foreign doctors come first to another American hospital for internship or residency, and later apply to the MGH for additional residency training. Drawing from the experience of his countrymen, a Colombian physician said that many times doctors from South America cannot get house staff positions at well-known hospitals because South American instruction in the basic sciences is poor. Therefore, many come first to smaller hospitals where they can perfect their English and gain experience. Then they apply to a top-quality, university-connected hospital to continue their training or research.

MISS ANNE COOKE

Dr. Masanobu Nakamura of Japan signs in with Miss Anne Cooke, registrar.

Similar Experience

Studies show this to be the experience of doctors from other geographical areas also. Physicians from other countries often enter medical fields, such as radiology, anesthesiology and general practice in which there are shortages.

There are two major ways a foreign doctor can come to United States hospitals like the MGH. One is as an exchange visitor. The State Department has granted two of these programs to the MGH – one for research and the other for clinical training. They operate similarly, but allow entry for different purposes.

"Exchange visitor programs involve the least red tape," Dr. Clay said. A doctor planning to treat patients in this country must take the examination of the Educational Council for Foreign Medical Graduates (ECFMG) given in English in their countries. It is similar to national medical boards, and somewhat less than half of those who take the test pass.

Obtaining a visa is almost automatic after receiving confirmation of appointment at the hospital where the physician will be employed.

Visits Limited

Exchange visits are limited to five years for internship and residency, and to three years for research. Dr. Clay said that extensions of stay are possible, but rare. One must convince the State Department that the additional training or the research project under way is desired by the academic institution to which the visitor will return, or that the extension will benefit the United States.

Changing programs in the middle of an exchange visit, for example, from a resident in medicine to a researcher in medicine, also requires an appeal to the State Department.

Although an exchange visitor may decide he wants to remain in this country permanently, he must leave the United States for two years after the end of his program before he can apply for an immigrant visa. Exceptions are cases in which the doctor might be subject to political persecution upon his return to his own country.

Second Way

The second major way one can come to the United States is as an immigrant. This involved process may include up to a two-year wait for a visa to be granted.

The immigration laws were changed in 1965 to correct discrimination against the "Asia-Pacific Triangle" which includes 19 countries. The old law allotted visas in proportion to the number of immigrants already in the United States from a given country. Unused visa numbers from nations with large quotas could not be reassigned to ones with small quotas and large numbers of applicants, like those in the Pacific Triangle, Dr. Clay explained.

The new law repeals the national origins quota. Since July 1, 1968, all aliens from all countries are subject only to an overall limitation of 170,000, including a 120,000 ceiling on western hemisphere immigrants.

Two Categories

There are two preference categories which make it somewhat easier for doctors to immigrate. One applies to physicians and highly skilled personnel and the second (aimed at helping alleviate American occupational shortages) to other scientific personnel, including medical secretaries. Under the new law, however, physicians with immigration visas are draft eligible.

Doctors who plan to come as immigrants to practice medicine must take the ECFMG exam and must prove to the State Department their medical qualifications. If they are coming to fill an occupational shortage, they must have a job lined up before they arrive.

There are also exchange programs that allow foreign allied medical personnel to come to this country. The Scandinavian-American Foundation program, for example, also includes agricultural, industrial, and other technical trainees. Some, like the Fulbright scholars, come with financial assistance of grants and fellowships.

SMOKE INDICATOR

Mr. Gilbert J. Nessolini, Director of Engineering and Maintenance, checks the new incinerator in the subbasement of the Gray Building. Inset: The control panel includes as an anti-pollution device an indicator and alarm to warn of excessive smoke.

To Dispose or Not – The Question at MGH

(Continued from Page 8)

processing are very negligible. This makes it more practical, for example, for this hospital to re-sterilize and process its own lumbar puncture sets than to buy disposable ones. Smaller institutions without the extensive sterilization staff and equipment might find the reverse to be true.

Cost of Labor

On the other hand, cost of labor can sometimes make a difference. Disposable sheets for inpatient beds are economically impractical, because it costs less to launder linen sheets than to buy disposables. However, disposable examination sheets are used in the outpatient department. Since each sheet is used only briefly, because of quick patient turnover, it costs less to buy disposables than to launder the large amount used.

Features like packaging of the expendables are carefully studied, too. Individual packages insure the freshness of each article, but the ease with which the package opens and the holding power of the seal may affect a product's acceptance.

Many disposables have passed the rigorous screening to improve patient care and facilitate hospital procedures. For instance, plastic syringes have almost entirely replaced glass ones.

Getting rid of these disposable syringes can present problems. The law requires that they must be rendered unusable before being dumped. When the MGH was using an outside contractor to get rid of its 160 cubic feet of combustible waste per day, the syringes and needles had to be shredded before they could be put into the container. Disposable petri dishes contaminated with bacteria cultures from laboratories had to be sterilized before being added to the heap. These extra steps detracted from the advantages of disposability.

Disposables account for about 10 percent of the 5 tons of waste the hospital accumulates in one day. Mr. Nessolini said the increase in disposables has been so gradual as not to affect noticeably the amount of rubbish.

Problems Solved

Many of the problems of getting rid of the troublesome articles, however, have been solved by the new incinerator in the subbasement of the Gray Building. In operation about two months and running 24 hours a day, 7 days a week, it can easily burn plastics, the little bits of metal on such items as syringes, and even contaminated petri dishes. The incinerator is complete with a "flue gas scrubber" to cut down on air pollution. Smoke is passed through a shower of water to rid it of ashes and harmful chemicals. This process thus makes air cleaner at the same time it eliminates mountains of waste.

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To Dispose or Not – The Question at MGH

When is a plastic catheter better than a rubber one? Or a plastic syringe better than glass? Or a paper cloth X-ray gown better than fabric?

These are questions that experts are trying to answer as the world of hospital supplies is deluged with the quickly multiplying variety of disposable products.

Business Thriving

The trend started about 20 years ago when hospitals began to substitute plastic tubing for rubber. Now industry has developed a multitude of disposables and expects business will continue to thrive.

A few of the use-once-and-throw-away products are tubing of all sizes, lengths and flexibilities, drainage containers, patient bedside units, surgical gloves and masks, thermometers, sheets, X-ray gowns, diapers, infant feeding equipment, operating room kits with sterile drapes and sheets, and more than 45 different kinds of syringes and needles.

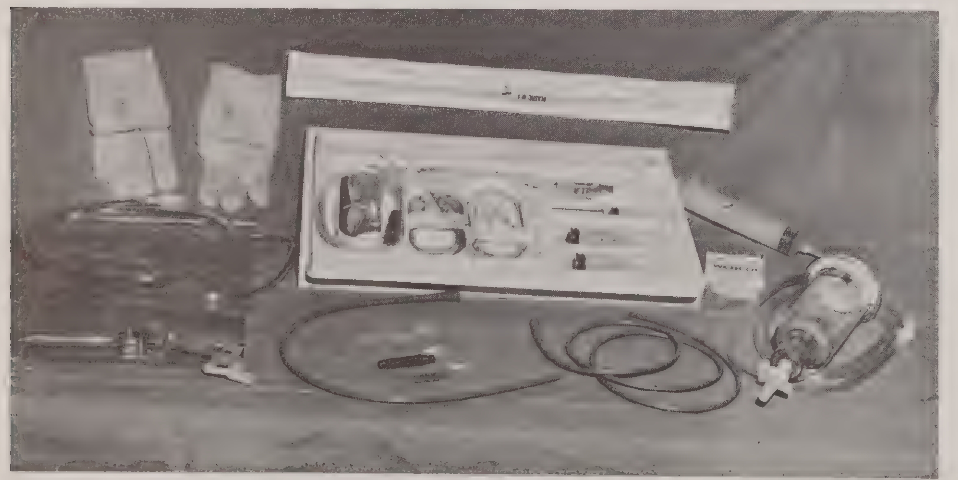
The main advantage of such articles is the decreased possibility of infection and cross-contamination. In many cases they are labor- and time-savers for the medical personnel using them. In addition, sterile, prepackaged items, thrown away after use, eliminate the necessity of re-sterilization and reassembly. Made of plastic or paper instead of metal, glass or cloth, they are often lighter.

Some items save particularly tricky sterilization problems. For instance, James A. Willis, Central Surgical Supply, said that in certain types of tubing there is a tendency for crystals to collect which are hard to remove. Plastic, throwaway tubing eliminates the cleaning problem. The often clear plastic tubing also allows doctors and nurses to stop possible blockage in the tubes before it can harm the patient.

Surgical Gloves

Surgical gloves are used here at the rate of 1,600 pairs a day. Rubber gloves create a complicated and expensive sterilization problem, and buying disposable ones is 20 percent less expensive than processing rubber ones.

In spite of the possible advantages of disposable products, the MGH does not use all that are available. In fact, this hospital probably uses fewer types of expendable products than many other hospitals.



The variety of disposable products ranges from complete sets, like the transfusion kit in the center, to individual needles of all sizes. These are only a few of the disposables used at the MGH.

The reason is that new products are carefully screened and evaluated by the Standardization Committee and must meet many requirements. This committee reviews a possible new item and decides whether it is worth further scrutiny. If so, the department which will be affected evaluates it according to pertinent criteria.

The Standardization Committee cuts across a variety of job titles. Members are Joseph M. Topjian, Materials Manager, chairman; Gilbert J. Nessolini, Director of Engineering and Maintenance; Howard Rath, Director of Building Services; Frank Dailey, Upper Store; Joseph Blanchard, Purchasing Agent; Edward Tateosian, Environmental Sanitation Engineer; Mr. Willis; Miss Cynthia DiAmantis, RN; Miss Adele Corkum, RN; Miss Diane Joerger, RN; Mrs. Grace Murphy, RN; Miss Ann Mahoney, RN; Miss Mary Regan, RN; and Roger Randall, Unit Coordinator.

Size a Consideration

Effectiveness, cost, patient comfort, effect on procedure and handling, and problems of disposal are only some of their considerations when discussing a new item.

One of the major factors in determining the economy of disposables is the size of the hospital and the amounts of supplies used. Often what might be economical for a smaller hospital costs too much in the quantity needed by a larger one.

At a hospital like the MGH, because a staff must be maintained to do sterilization, whether or not many disposable items are used, the savings on cost of

(Continued on Page 7)

MGH
News

Vol. 29 No. 3 Massachusetts General Hospital, Boston, Massachusetts March, 1970

A Psychiatric Community: Man's Humanity to Man

Inseparable Friends, Both in Life and Death

For 13 years Charlie and Josephine had been inseparable.

One day, as Josephine watched in terror, police shot Charlie dead. Josephine drew near Charlie's lifeless form. Sinking to her knees, she quietly laid her head on his bloody body.

Police let Josephine express her grief in the hope she would gain relief. But, although she had been healthy until the shooting, Josephine died 15 minutes later, never having raised her head from Charlie's body.

Josephine and Charlie were characters from real life, not an opera or a movie. But they were escaped llamas from a zoo – not humans.

Dr. George L. Engel of the University of Rochester described the fate of the llamas to illustrate a point he made at an MGH Psychiatric Grand Rounds:

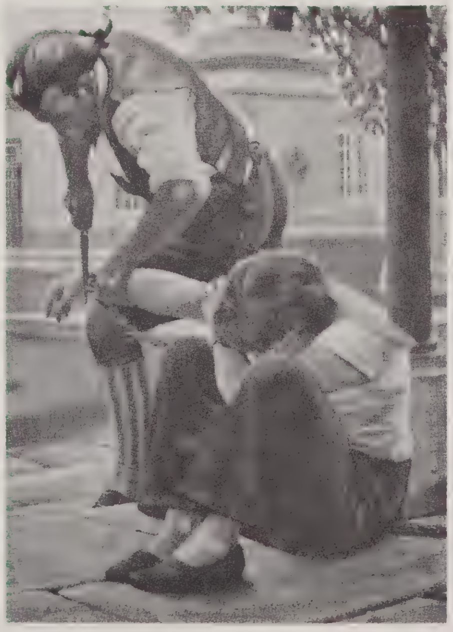
"I cite this example," he said, "to indicate that we are dealing with a general biological phenomenon, not simply a process peculiar to an occasionally oversensitive human being. . . . Actually, such occurrences among animals are well known to naturalists and zoo keepers, and the circumstances seem very similar to what we have been describing in regard to humans."

What Dr. Engel was describing represents more than 20 years of work of the Medical-Psychiatric Liaison Group of the University of Rochester. Their aim is to answer the question of why people fall ill or die at the time they do: "What determines that a man shifts or drifts or plunges from a state of good health into one of illness or even dies at a particular juncture in his life?"

Dr. Engel concentrated on the psychological state that his group commonly finds preceding the onset of illness – a state they call the giving-up – given-up complex.

"Many studies," he said, " . . . strongly suggest that this complex is neither a coincidence nor a consequence of the illness but that it plays some significant role in modifying the capacity of the organism to cope with" disease-producing factors occurring at the same time.

(Continued on Page 6)



Chains and fetters removed in 1795 from insane woman at a Paris hospital. Detail from one of a series of paintings in Parke-Davis' "Great Moments in Medicine."

Two psychiatric patients wheeled the bed of a third into a large living room in the MGH's psychiatric ward.

On the bed a man they called Ray lay motionless on his back. A large man with disheveled hair, he suffered from a muscle disease. Ray was only 44, but he had given up the will to live.

Ordinarily depression that severe might have warranted resorting to electric shock treatment. Yet Ray had pneumonia that confined him to bed and made electric shock medically unsound.

Ray opened his eyes but ignored his surroundings. If he had been looking about, he would have seen that his bed helped form a large circle of furniture in which easy chairs competed for attention with a brown sofa.

Twenty-five psychiatric patients including Ray occupied most of the furniture. The remaining 15 people were psychiatrists, residents, interns, medical students, nurses, an occupational therapist, social workers, chaplains and nursing assistants.

"This is crazy," one of the newer residents whispered to a companion. "It won't work. Ray is too depressed. He's out of it."

Aside from an occasional whisper, an uneasy silence gripped the room.

Then an 18-year-old patient nervously cleared her throat. Perched on the sofa with her slack-covered legs tucked under her, she spoke to Ray, timidly at first. As anger began to rule her voice, she spoke with increasing conviction:

"Why have you given up? Why do you want to die? You know you are

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EDITORIAL:

A Model for Revolutionary Innovation?

A page-one story in this issue of the *News* announces an experimental psychiatric program at the MGH. Like all new concepts this one, called a Therapeutic Community, borrows from the past.

Yet, despite elements of familiarity, the program is bound to incite controversy within psychiatry. Much of the wrath will stem from the unorthodox approach employed by the Therapeutic Community. Staff members emphasize encouraging the patients to act and speak rationally. On the experimental ward, use of individual psychotherapy becomes a supplementary tool, and psychoanalysis does not exist.

Such a thrust obviously relegates to the background the methods of Sigmund Freud. The MGH experiment comes at a time when younger psychiatrists are increasingly challenging psychoanalysis while respecting the many contributions that Freud has made to modern psychiatry.

Any new movement tends to overstate its case. In Freud's instance his followers often went beyond the master in establishing the cult of psychoanalysis. Part of today's counterswing may represent a backlash from that overstatement.

In setting up its Therapeutic Community, the MGH may be proved eventually to have swung somewhat too far away from Freud. At any rate, some psychiatrists criticize the new unit on several grounds other than the nonuse of basic Freudian tools:

- They object that social workers deal mainly with the Therapeutic Community as a group rather than on a one-to-one basis. This, they claim, is not social work. Our answer: So what, if what they do helps.
- They criticize letting patients attend meetings where staff members openly disagree about treatment. Our answer: This practice is debatable.
- They argue that the 38-day average stay cannot possibly achieve lasting or even real changes in personality. Our answer: It is vital to make it possible for a sick person to function again in society whether or not his personality has basically changed.
- Critics object to the unorthodox technique of allowing patients to confront one another openly with unpleasant truths.

Our answer: Confronting patients with truths about one another seems to help in many cases. Whether in the long run it will prove appropriate for all the many types of mental illness remains to be seen. Dr. Bernard S. Levy, who heads the ward, recognizes the validity of this question and hopes to refine the use of this technique. But this remains only one aspect of the program.

The test of the MGH Therapeutic Community will be the long-term benefits that accrue to patients. The preliminary results appear promising enough, however, to make one cautiously optimistic. Some form of Therapeutic Community may provide the model for a revolutionary innovation – at the very least, one important form of inhospital psychiatric care.

Patient Finally Knew That Others Care

(Continued from Page 1)

killing us all by what you are trying to do to yourself. We care about you. We don't want you to die. Don't die."

Except for a fluttering eyelid, Ray remained motionless. One by one the patients and staff vented their anger at him for giving up. Ray remained silent.

More than an hour later when the last of the patients had said they wanted him to live, he still said nothing. He was even silent as two patients wheeled him back into his room which adjoined the living room.

Actually, Ray had ignored people increasingly for several weeks until he fell completely silent during the last few days. He even ignored his wife when she visited him at night.

A Changed Mood

Soon after this group meeting, however, his mood began to change. Ray began talking to people again. He recovered not only from his pneumonia but from the extreme depression which had preceded it and worsened with time.

Psychiatrists can offer no scientific proof that the meeting had anything to do with Ray's psychological recovery. Many of the non-unit psychiatrists who know about the case argue that the meeting and the improved mental health were pure coincidence.

Of those who view the session as a turning point, some even state that the case is consistent with the theory of Dr. George L. Engel of Rochester,

(Continued on Page 3)

The *MGH News* welcomes letters from its readers. To avoid condensation, letters should be brief and must be signed. Names will be withheld on request.

With its March issue the circulation of the *MGH News* increases to about 70,000. The expanded list of subscribers is being computerized. The operation is a complicated one and undoubtedly mistakes will be made in the initial months. Your patience and understanding are appreciated.

‘He Just Seemed to Climb Uphill Gradually’

(Continued from Page 2)

N.Y., who gives attitude a role in physical health. (See other page 1 story.)

Dr. Bernard S. Levy, Chief of Inpatient Psychiatric Service at the MGH, is convinced at least that the meeting triggered Ray’s psychological improvement.

“It made all the difference in the world,” he said, “that the patient finally realized that others care.”

Doors Are Open

Dr. Levy founded the maverick unit housed in the historic Bulfinch Building. Until 1½ years ago, the ward served to diagnose mental patients. Once diagnosed, they were transferred to other hospitals or discharged.

Moreover, traditional methods of management led to locking doors because of concern about patient violence. The fact that doors were locked made patients fear to be there and nurses uncomfortable to work there. Now the ward is open.

If one word pervades Dr. Levy’s philosophy, it is optimism. “If we are nonviolent in our approach to patients,” he said, “patients will become nonviolent in their behavior. If we lock them in a secluded room and treat them as though they are violent, they will act that way.

“Psychiatric institutions can make people sick – or well.

“The doctor’s expectations are very important in psychological care. If he expects the patient to be ill a long time, the patient can be ill for a long time.

Encouraging Approach

“We tell him just the opposite. We say, ‘We expect you to get better in a couple of weeks.’ What’s more, the patient has no examples of patients who have been here for five years or even five months. The average stay is 38 days.”

Dr. Levy described the case of a wealthy young man who had spent 10 years and $300,000 in a private mental institution. When he was transferred to the MGH, his psychological state was low.

His previous psychiatrist came to the MGH and told the staff that the patient was incurable and dangerous.

Less than three months later, the patient went home.

Although, like most “cured” psychiatric patients, he still has problems, he can now function in society.

“I can’t recall any particular incident that led to his improvement,” Dr. Levy said. “He just seemed to climb uphill gradually.”

Open Ward

Staff members believe that the openness of the wards plays an important role in the recovery of patients. The sicker the patient, the nearer he is placed to the center of activity.

Even if he is unable to talk rationally, staff members and other patients talk rationally to him. Should he answer in a nonsensical way, they say, “That doesn’t make sense.”

As one staff member put it:

“If the patient is locked in a room, he can’t talk to anyone if he does come out of it. Here, if he is having his first good day, people are bound to notice it. ‘Oh, you’re better today,’ they say. And thus the patient can converse with others rather than having to talk to himself in his locked room.”

If the MGH’s Therapeutic Community gives the patient unusual freedom, the community also demands that he observe its rules.

Chief among them is the prohibition against “acting out.” Threatening violence either to someone else or to one’s self, refusal to take medication and leaving the ward without permission – these are all prohibited.

“One to One”

A patient whose violation of such rules may indicate he needs special help gets put on “one to one.” This means that another patient is assigned to stay with him.

The theory is that the added contact and conversation will help integrate the sicker patient into the community or help him over a difficult period. At the same time, the other patient is given additional responsibility that makes him feel trusted.

Photographs on pages 3, 4 and 5 were posed by MGH employees and Harvard Medical School students.

Violation of ward rules can also result in a “crisis meeting.” Either patient or staff may call such a meeting. In the case of Ray, his doctor sought the session as a last resort to rally him from deepening depression.

Routine informal meetings, however, occur three times every day. In the morning, the staff meets to discuss patient care. Patients are free to attend those sessions and do. If a patient disagrees with a psychiatrist’s approach, the patient often says so. Mostly, though, the staff dominates this conference. Their disagreements are aired openly in front of the patients.

Patients Speak Out

Staff and patients attend daily an afternoon gathering, but here the primary focus is on the patient. Psychiatrists and other staff may enter the conversation. Yet patients often do as well as psychiatrists at encouraging their fellow patients to talk out their problems. Indeed a patient often interrupts a staff member who he believes is ineptly trying to draw out another patient with such a remark as:

“Leave him alone. He’ll speak when he’s ready to.” Sometimes the psychiatrist agrees with or at least accedes to the criticism.

The psychiatrist who is used to controlling the scope and direction of an interview in his private practice sometimes finds his initial exposure to one

(Continued on Page 4)

Living room provides setting for meetings attended by staff and patients.

Patients Perform Tasks Around the Ward

(Continued from Page 3)

of the MGH group meetings a startling experience. Should the smoldering aftereffects of a breakfast argument with his wife erupt into an unjustified snarl at a patient, he can expect swift verbal retribution from patient and colleague alike.

"It reassures the patient," Dr. Levy said, "to learn that sometimes the psychiatrist is at fault."

Patients Lend Support

As might be expected, patients speak as frankly with one another as they do with psychiatrists. A patient seeking his peers' opinion of him hears the bad as well as the good.

Mostly, though, patients lend one another support. They confide to someone airing his problem their own similar experiences and anxieties. Those who have progressed are likely to say:

"A couple of weeks ago, I felt exactly like that. I learned, though, that a lot of these fears were of my own making. Now that my attitude toward others has changed, they in turn seem to treat me differently. Everyone is more friendly."

The third meeting takes place at night. Parents or spouses are the leading members added to the cast.

Family Involvement

Two evenings a week, the spouses of patients participate. Parents take part on two other evenings devoted to adolescent problems.

The staff considers family involvement a vital aid to recovery; for usually the family must learn how it can help the patient.

Between meetings patients are encouraged to roam about the ward and talk to one another. Themes of scheduled sessions often spill over into individual conversation in which patients encourage rational conversation.

The Therapeutic Community, however, provides much more than an open, normalized, supportive setting. Doctors select various other treatments for each patient.

An expert in the use of lithium for manic-depressives, Dr. Levy encourages judicious use of drug therapy. Staff members order electric shock therapy for severe depression that resists all other treatment. They also use individual psychotherapy. Yet the latter method plays a small role.

"I believe you get a person back to health and *then* try to talk in depth about his interpersonal problems," Dr. Levy said.

Tasks Around Ward

To this end, each patient has tasks to perform around the ward for three hours a day. These may range from answering the nursing station telephone to cooking the Wednesday night meal.

The occupational therapist, Mrs. Rosalie Katz, teaches patients new skills. She emphasizes constructive activity like typing that can be related to jobs in society.

Recreational activities offer diversion in the Therapeutic Community.

Once the patient is nearing the end of his stay, Mrs. Katz encourages him to seek employment in the community. At that point, the patient may get a leave of absence to look for work. If possible, he returns to the hospital at night during his first few days on the job. Such returns help bridge the gap between institution and society.

Or the patient may go to a halfway house which helps provide the same sort of bridge. When he returns to society, he usually continues with drug treatment or family psychotherapy.

Until now, the unit has received no publicity. Even so, the Therapeutic Community has to turn away an estimated 12 patients for every one it accepts for its 21 beds. Patients come from all over the country, and the demand for the limited space is expected to increase markedly. Preference is given, however, to those transferring from within the hospital.

Elastic Admission Rules

Patients must themselves desire entrance. Aside from this, the only restriction is the minimum age of 14. Even this rule is elastic enough to permit a mother who needs help to bring along an infant who is a factor in the mother's problem.

Elastic admission rules bring variety into the types of patients admitted. Some are millionaires. Others are on welfare. Unlike most private mental institutions, the MGH ward numbers a majority of middle-income people among its patients.

Often they form lasting friendships that carry over into their lives in the community. Several former patients are rooming together in Cambridge and Beacon Hill.

The variety in patient economic and social status is equaled by the varied types of mental illness encountered.

Nearly half suffer from severe depression. More than a quarter have character disorders, severe defects in their character preventing them from relating normally to people.

300 Discharges

About 15 percent are schizophrenics whose "split personalities" lead them essentially to withdraw from relationships with other people. A little over 1 in 20 suffer from a "situational reaction," a virtual collapse under the

(Continued on Page 5)

(Continued from Page 4)

weight of some event or personal loss.

About 300 patients have been discharged from their Therapeutic Community since its founding. The Harvard Center of Community Health and Medical Care will cooperate in evaluating its success.

Dr. Levy expects the evaluation to prove a helpful guide more than a scientifically exact account.

"The evaluation of the outcome of psychiatric treatment has not reached a scientific basis," he said. Some preliminary impressions, plus mathematical data of varying potential relevance, have already been collected.

Four Episodes

One index of the open-door feature's effectiveness in the MGH program is the number of patients who were unable to be controlled by methods normally used on this ward. In 1½ years with 300 patients, the ward lists four episodes. In three of the four, alcoholics with delirium tremens (DT's) threatened to strike someone. They had to be transferred to other institutions.

"These episodes were failures on our part," Dr. Levy said.

Two other patients made minor gestures of suicide by taking four or five pills. Successful suicides are a problem that mental institutions have to face, and minor suicidal gestures are considered fairly common. Again, statistics in this area are rare.

With the mix of patients in the MGH Therapeutic Community, however, many more suicide gestures could reasonably have been expected. Many of the patients are admitted after a serious suicide attempt while many others have made gestures of suicide.

Occupational therapy teaches skills like typing and use of tools and lays stress on encouraging patients to find jobs in the outside community. While in the ward, the patients are assigned various tasks.

At one time 5 of the 21 beds in the unit were occupied by patients who were admitted to the hospital after nearly successful suicide attempts.

One important statistic to be sought in the follow-up study is the number of patients who have made gestures of suicide (such as wrist slashing) after discharge. To date the hospital has learned of only one.

By clustering patients with suicidal tendencies in this ward, the hospital achieves economy of personnel.

Before the unit opened, the MGH had as many as 18 suicidal patients scattered throughout the complex at one time. They required 54 special nurses. Including replacements needed for relief, such as during lunch hours, these 18 patients tied up the services of an estimated 100 nurses in all.

By comparison, the Therapeutic Community numbers 20 nurses on its staff. And because they care for so many suicidal persons, they gain special skill in dealing with them.

Preliminary results of the follow-up show that the patients heard from so far are functioning well in society. It is possible, however, that only those who are doing well have responded to queries.

Reaction of Staff

In any case, only about 10 of the 300 patients have been readmitted to the unit after discharge.

The cost of treating patients on the Bulfinch ward runs $70 per day.

"It is cheaper on a daily rate to put a psychiatric patient in a state hospital," Dr. Levy said. "But if he stays there a long time, the cost is tremendous."

One subjective measure of the Therapeutic Community is the reaction of patient and staff. Patients seem to react enthusiastically.

"The morale is very high among nurses," Dr. Levy said. "The role played by both social workers and nurses is tremendous. What these gals do is amazing. The amount of themselves that they give!

"We make the nurse a partner in the team and give her constant respect and attention. She is with the patient 24

(Concluded on Page 6)

Cooking Wednesday night dinner is one of the responsibilities in the Therapeutic Community.

(Continued from Page 5)

hours a day. In many ways, she is the one who really cures the patient."

Because staff members make such emotional investment in the patients, they often go home exhausted.

"To be psychiatrically ill," Dr. Levy said, "is a terror. To share that terror with people takes a lot out of the staff.

"But the workers get the feeling that they are doing something meaningful and that they are respected as people. They share a great cohesiveness by doing things together for people. Helping people provides them with a meaningful existence. They may not succeed, but nobody keeps them from trying.

"It may sound cornball, but man's humanity to man is what cures people up there. The patients know that both the staff and the other patients care."

Off Came the Chains

In one sense the MGH Therapeutic Community owes its origin to a Frenchman named Philippe Pinel.

In the 1790's Pinel removed the chains from mental patients and gently persuaded them to get better. Psychiatric hospitals that grew from his influence did well.

Then large state institutions came along and depersonalized treatment. It was not until the 1950's that drug therapy enabled pioneers in some state hospitals to revert to the kindly, personalized treatment of Pinel.

Dr. Bernard S. Levy first encountered some of the elements he has incorporated into the MGH Therapeutic Community when he trained at Johns Hopkins Hospital in Baltimore. He drew still other elements from the National Institutes of Health in Bethesda, Md., where he also served.

When he came to the Massachusetts General Hospital and Harvard Medical School two years ago, he brought with him ideas from those two institutions. To those concepts he added his own ideas.

"Most important," he said, "I have given permission for the staff to be themselves.

"Once I wanted to lock the doors at night. Both the staff and patients rebelled. They said, 'If someone is that disturbed that he has to be locked in at night, we'll special him. We'll stay with him at night.'

"I agreed to try their approach and it worked."

Inseparable Friends, Both in Life and Death

(Continued from Page 1)

"This position is far from proved, but in our view the evidence is sufficient to justify careful study and characterization of the state itself – whatever its role" in causing disease may ultimately prove to be.

" . . . It is interesting that most lay people take it for granted that a person's frame of mind has something to do with his propensity to fall ill and even to die.

"But physicians, who in their nonprofessional roles may share such notions, rarely regard this as a legitimate area for their scientific interest. . . . Yet this is a theme that has been so commonplace in popular thinking and in folklore and literature throughout the ages, from ancient sagas to modern soap operas, that one cannot help wondering whether it is based on actual observations or whether it represents some kind of mass delusion."

Gap Is Closing

Dr. Engel said that the psychological aspects of physical disease lost favor with investigators during the latter half of the 19th century.

"But now at long last the gap is closing," he said. "The development of an organismic point of view is finally making it possible to understand how the individual functions within an environment and how mind and brain act as mediators and regulators of the body economy. Such insights began with clinical observations of the impact of social and environmental changes on the person."

Dr. Engel has collected 100 newspaper clippings reporting deaths under unusual circumstances. Half are commonly called "dying of grief" – persons who died suddenly or soon after receiving news of a loved one's death. Another 10 died expecting such a loss.

DR. GEORGE L. ENGEL

Still another 32 died during situations of danger such as riots or storms.

"All," Dr. Engel said, "involved a change in the environment about which the victim felt powerless to do anything – the sudden death or the threat of death of some important person, a real or fantasied great personal danger, a sudden humiliation or a loss of status. And all were also circumstances that we ordinarily associate with painful emotion. . . . "

Five Characteristics

Dr. Engel stated that the important variable is not the external situation itself but how the individual responds to it. He lists five characteristics of the giving-up – given-up complex:

1. The patient reports being at the end of his rope. He may feel helpless because of what he regards as failures or deficiencies in his environment to which he looks for a solution. Or, he may feel hopeless because of personal failures or inadequacies.

2. He has a depreciated image of himself, as no longer competent, in control or capable of functioning in his accustomed manner. This is particularly likely after the loss of a loved one, of status, of home or of a valued possession.

3. Commonly he feels less gratified or supported in important human relationships or in roles in life. Sometimes this occurs because of actual disappointments, losses or separations, and sometimes because of threats to such roles or relationships.

4. The sense of continuity between past, present, and future is disrupted. The devices used in the past no longer are applicable, and it becomes difficult to project oneself into a future that seems uncertain, unpromising or bleak.

5. Patients may also be reminded of other occasions in the past when they felt helplessness or hopelessness. And when such memories involve situations never adequately resolved, there may be a cumulative effect as well.

"Actually," Dr. Engel said, "what we are designating as the giving-up –

"What determines that a man shifts or drifts or plunges from a state of good health into one of illness or even dies at a particular juncture in his life?"

given-up complex is in fact only an exaggeration of a normal psychological phenomenon. Everyone in this room has many times in his life been at such a psychological crossroad where, for the moment, at least, the smooth flow forward was disrupted, and one seemed to whirl about directionless until some suitable solution presented itself.

"When successful, as it is most of the time, this constitutes a developmental step forward and adds to the variety of adaptive solutions available for future crises. But sometimes circumstances are such that prompt resolution is impossible, and, for varying periods of time, one finds oneself alternating between giving up and struggling again to find a solution. It is during such periods of psychic disequilibrium that we believe disease may supervene.

Economy Is Altered

"Essentially we are proposing that during such a state the total biologic economy of the organism is altered, at times in such a way that its capability to deal with certain potentially pathogenic [disease-causing] processes is reduced, permitting disease to develop. The giving-up – given-up complex thus constitutes the psychological or behavioral reflection of a psychobiological state.

"However, the predisposition to the organic disease must already exist; otherwise the person may be psychologically distressed, but he will not become ill. Thus, this psychobiologic condition contributes to the emergence of the disease; it does not cause it, nor is it a necessary or sufficient condition for disease development."

Dr. Engel notes that there is ample evidence showing that it is precisely when the central nervous system is failing in its task of processing input that emergency biologic defense systems are invoked.

Too Much Input

"Such failure," he said, "results when an input relevant to the organism's adjustment is too great (overload) or when no program or response to the input is available (incongruence); or in psychological terms, when information cannot be handled promptly and effectively by mental mechanisms alone. Under such circumstances the organism has available no relevant behavior.

"At this point, the limbic structures of the forebrain and midbrain, forming an elaborate neural [nerve] circuit with the hypothalamus [a part of the brain that regulates a wide range of activities such as sleep and temperature] in the center, respond by mobilizing emergency systems to prepare the body to deal with or avoid damage.

"Exactly what biological activity is associated with the giving-up – given-up complex is not yet known. But having identified and characterized the complex in psychological terms, we are now in a position to develop the experimental approaches necessary to define its biological dimensions and to investigate how these influence susceptibility to disease."

The fourth in a series of articles on basic research will appear in the April issue of the *MGH News.*

Foreign Doctors

(Continued from Page 8)

But doctors from the western hemisphere who used to be able to get visas immediately now have to wait with those from other countries for almost a year.

A clinical fellow in radiology said he could not become an Exchange Visitor when he came to this country four years ago. He was here with a tourist visa and waited only a month to have it changed to an immigrant visa.

He will return to Argentina when he completes his residency, because he considers it home, and also because he will be subject to the draft when his deferment for medical training runs out.

"Remote Chance"

Officials told a Colombian doctor, now an MGH research fellow in pediatrics, when he applied for his visa that there was a "remote chance" he would be drafted. After completing his year of internship, he *was* drafted and served two years before continuing in medicine. He too may return to his country to teach.

Under the old law, some doctors who planned to return to their countries use the immigrant visa as sort of an unlimited Exchange Visitor Program. There was no time limit, and they were freer to change jobs. However, with the new law, Dr. Clay feels that the Exchange Visitor Program is by far the easiest way to come.

Doctors, who used to advise their foreign staff members to come as immigrants, now suggest they apply for exchange visas so that they will not be subject to the draft.

Staying the Limit

Staying the limit allowed under an Exchange Visitor Program may pose a dilemma for the individual choosing to reenter his own academic community after a five-year absence. For he must regain his place on the academic ladder of his homeland.

Alternatively, the individual choosing to leave the United States for two years to apply for an immigration visa faces other difficulties during this gap. His American work lies fallow for two years while, as a transient in another land, he cannot undertake a long-range project. Securing funds for the interim stage may also prove insurmountable.

(End of Series)

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Problems Beset Foreign Doctors in America

(Second of a Series)

A foreign doctor coming to this country for training or research faces difficulties whether he comes as a Foreign Exchange Visitor, or an immigrant.

The main difficulty with the Exchange Visitor program is the time limit. A researcher in the Pulmonary Unit, who feels the program is generally satisfactory, does foresee possible difficulty at the end of his five years:

"If I have a project under way at the end of five years, some flexibility in the program would be helpful."

A clinical and research fellow in surgery also finds the time allowed insufficient.

"The program is impractical," he said, "because it is divided into either clinical training or research, and you are not allowed to change. If you come just for the clinical experience, you do not get the training to round off your education.

"Clinical training alone is not enough for you to enter a university system upon your return. Your entrance is enhanced by research done here. The program is moderately unfair to many doctors.

"Most people end up in a community or second-class hospital where academic emphasis is not top priority. It is difficult to become a member of the house staff in a university-connected hospital.

"Not Enough Training"

"So, many people get their preliminary training in a community hospital, then come to a big university hospital as a clinical or research fellow in the fourth or fifth year in this country. They have only one or two years for the kind of research that they want to do. This is not enough training to utilize on returning to their country."

Mrs. Milford D. Schulz, chairman of the Service League's Reception Center, helps locate housing for new-arrival, Dr. M. Shaban of Egypt, while Dr. Man Chung Hun of Korea and Dr. Doreen Browne of England, previously assisted by the Service League, offer encouragement. The women's group locates housing and furniture, distributes free concert tickets and plans parties for foreign doctors and their families.

Dr. Charles L. Clay, the MGH expert on foreign doctors and their problems, said doctors often go for their internship to another hospital, which does not require (as the MGH does) a personal interview for applicants. Once in the country, they may apply for residency or research here.

Another Exchange Visitor, a resident in anesthesia, criticizes a peripheral difficulty that may arise.

Family Considerations

"The program is not sufficient anymore," he said. "The original idea was to provide training for a short period of time, but the visitor's family is not taken into consideration."

Visas are available for relatives of Exchange Visitors, and about half the married foreign doctors here bring their wives and at least one child. But getting permission for a wife to work is rather difficult.

Dr. Clay said that some doctors who come as Exchange Visitors decide they do not want to return to their countries at all. Working and living conditions as well as salaries in the United States are attractive.

But under the law, the doctors must return to their countries, or at least leave the U.S., for two years before they can apply for an immigrant visa, which then might take a year or two to obtain.

Longer Initial Wait

Although the visa entitles a person to stay as a permanent resident or become a citizen, coming as an immigrant also has its problems – probably greater ones, according to Dr. Clay.

The initial wait for a visa is generally much longer. Since the revision of the immigration laws, effective in 1968, the wait for a visa is more uniform in different areas of the world.

(Continued on Page 7)

MGH
News

Vol. 29 No. 4 MASSACHUSETTS GENERAL HOSPITAL, BOSTON, MASSACHUSETTS April, 1970

Can Brain Dysfunction Result in Poor Reading?

(Fourth of a Series on Basic Research)

Does Johnny read poorly because something functions improperly in one area of his brain?

For many Johnnies the answer may prove "yes."

The returns are not all in yet, but an MGH study with far-reaching implications shows preliminary results that lean strongly in that direction.

Researchers last summer tested 27 Brookline children who were poor readers. All third and fourth graders, the youngsters were attending a Boston University summer remedial institute.

The research group measured some of the brain's electrical activity which occurred immediately after a child had been shown a light flash. This procedure was repeated many times. A computer averaged these brain responses so that the brain's random activity could be eliminated, leaving a clearer picture of those impulses produced by the flash.

Both poorer readers and spellers tended to exhibit weaker responses than the better readers and spellers in an area of the brain called the left parietal lobe. In most people that lobe tends to be the dominant one for language activities.

A second study involved 20 boys, aged 9 to 15, from the Margaret Gifford School in Cambridge. At that private school for children with learning disorders, researchers matched ten of the worst readers by age, IQ, and social class with ten of the better ones. Once more the poor readers exhibited less response in the left parietal area to the flashing lights.

"It is quite clear that not all poor readers are showing this phenomenon," C. Keith Conners, Ph.D., said. " . . . In general, we think the majority of poor readers are not going to show this specific pattern."

What Dr. Conners expects the other readers to demonstrate is a pattern reflecting an inattentive state or poor motivation.

"A variety of factors could affect a child," he said, "and make him distracted and not attentive, and this could account for poor reading."

The reading studies that Dr. Conners is conducting as Project Director of the MGH's Child Development Laboratory are basic research. As such, they are intended to find general truths about reading problems.

(Continued on Page 5)

Trinidad Boy Revises Medical History By Living to Age 14

Winfield Williams was a 1½-year-old native of Trinidad in 1957 when a heart specialist pronounced his probable death sentence.

Winfield suffered from a cardiac disease which then defied cure. By all medical odds, he should have died in infancy. Among the complications that were "sure" to develop if he lived long enough was high blood pressure in his lungs.

Twelve years later, on last Feb. 3, an MGH team, under Dr. Mortimer J. Buckley, operated on him. By living to that point – 14 years old – Winfield is believed the oldest untreated person in world medical literature ever to have survived this type of condition. Just as remarkably, his lungs somehow had escaped the "sure" high blood pressure.

Weighed 60 Pounds

But Winfield had not escaped the other ravages of the disease. At the time of surgery, he weighed only 60 pounds. He tired easily and could no longer attend school. Walking across the room – even speaking a few sentences – reduced his breathing to gasps. Time was clearly running out on Winfield.

His problem was a fairly common disease of newborns called transposition of the great vessels. In normal blood circulation, the large vein called the vena cava carries blood that has given up its oxygen on a journey to one of

(Continued on Page 4)

Winfield Williams examines a model airplane that he built. Winfield is believed to have made world medical history by living to age 14.

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EDITORIAL:

New Budget Weakens Research, Training

In December, the *MGH News* began a series of articles on the importance of basic research to medicine. Whereas applied research uncovers knowledge that directly helps fight disease, basic research seeks to reveal general truths. Both are vital.

The first article described the concern of scientists that the federal government was about to relegate basic research to a stepchild's role. This fear was apparently justified. In its proposed 1971 biomedical budget, the administration has raised its expenditures for health-related research from $1.62 billion to $1.66 billion. This 2½ percent increase, however, represents less than half the bite of inflation. In other words, the proposed budget would, in effect, cut research by a little more than 2½ percent. And if the administration follows its recent practice of not permitting all appropriated funds to be spent, the reduction would prove even greater.

Of much more concern, though, is how the money is to be spent in 1971 compared with 1970. Applied research is to go up seven percent. But without even taking into account the ravages of inflation, basic research would drop three percent. This proposed budget confirms the *MGH News*' fear that the government is developing a dangerous philosophy about research. For those who have been concerned that Washington has in the past lacked a policy toward medical care, development of any policy might be encouraging. Yet the thrust toward quick, practical achievements will be self-defeating if in the long run the policy suffocates the basic research which so often feeds applied research its ideas.

Another change in the proposed budget now before Senate and House committees presents the health care field with an additional problem. Funds for postgraduate training of physicians would be slashed even more severely than research funds.

Over the last 10 years, the number of training grants from the National Institutes of Health to support individual physicians on specialty training, including residency programs, has increased greatly. Such grants have been so severely restricted in the proposed 1971 budget that the number of persons taking their residency in hospitals would have to be cut. This would prove especially true in psychiatry, a field already plagued by a severe shortage of physicians. One way around the problem would be for hospitals to increase their support of postgraduate education. Such a move, however, would add to the already skyrocketing cost of patient care. Continued federal training funds, probably separated from research grants, seem a better answer.

Letter to the Editor

Dear Editor,

Today I received my first issue of the *MGH News*. I found it of tremendous interest and read every word with pleasure and excitement.

I am particularly interested in the article on page 8 (December issue) entitled "Researchers Share a Common Concern." Could we, your subscribers, help? Could we have a blank to sign or could you send us the proper address where we could write to Washington to express our opposition of reducing the Federal aid to research?

Mrs. Harriet S. Miller
Rutland, Vermont

(Editor's Note: Readers who wish to support medical research can write their own Congressmen and Senators of their concern. Committee hearings on the 1971 budget are being held in April in both the House and Senate. By not allowing for inflation, the administration's 1971 budget in effect substantially cuts funds both for training of doctors and for research. See editorial.)

The *MGH News* welcomes letters from its readers. To avoid condensation, letters should be brief and must be signed. Names will be withheld on request.

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Standardized Tests Mean Better Transplants

Tissue typing is a way of matching donors and recipients for organ transplantations.

Scientists are getting better at the procedure. Yet they still have difficulty in comparing typing results obtained in one laboratory with those obtained in others.

This problem in communications is what brought scientists from leading typing centers in the East, South and Midwest to an MGH workshop in March.

What makes tissue typing necessary in the first place is the body's reaction to transplanted organs. The body tends to reject all such organs but those transplanted between identical twins. Organs transplanted between identical twins are not rejected because such twins are the products of a single fertilized egg, and accordingly they inherit identical tissue types.

Even unrelated persons, however, may have tissue types similar to each other. Matching nonrelatives for compatibility as donor and recipient of an organ greatly improves the likelihood that the transplant will be successful.

Donor and Recipient

To match donor and recipient, the scientists examine the white cells of the blood. These cells contain antigens which are similar or identical to those present in other cells distributed throughout the body.

"Working within a family," Dr. Bernard Amos of Duke University said in an interview, "we can pick out what could be the ideal donor." A workshop participant and the man who devised the commonly used tissue-typing method, Dr. Amos added, "but where we all get into trouble is when we try to match unrelated cadaver donors."

To improve the science of tissue typing, seven government-funded regional centers are operating in the United States. The MGH has acted as the tissue-typing center for the Interhospital Organ Bank, a Boston-based regional organization that obtains, preserves and distributes organs for transplantation.

"At the moment, these regions can communicate well enough within their area," Dr. Amos said. The breakdown occurs outside the region. This is because in testing tissues, each center uses its own variations of techniques.

What really triggered the workshop was the analysis of serum sent from the MGH to Duke. Dr. Amos telephoned his results to Henry Winn, Ph.D., Director of the MGH Histocompatibility Laboratory. In their conversation they realized that while their respective laboratories were in general agreement they had come up with an annoying number of discordant findings.

"We wanted to get together because we cannot afford this kind of lack of communication," Dr. Amos said.

At the workshop, the participants ran tests using their slightly different techniques. When they got differing results, they redid the same tests to seek ways of standardizing their results.

A Big Problem

The variables come in some of the serum factors (antibodies) that the laboratories use in testing. These need to be given standard designations.

"We still don't know how to define some of these adequately," Dr. Amos said, "and this is a really big problem. The 10 or so factors already clearly defined are not enough to guarantee compatible organs outside of families.

"So we've got to keep on nipping away at this fringe area of factors not clearly defined."

The entire testing system depends on having clearly defined samples of many different types of factors.

"No one laboratory will ever have sufficient number of the rare types needed," Dr. Winn said. "They have got to come by pooling."

Once enough rare factors become clearly defined, the centers will be better able to compare notes on which types of factors are most often associated with rejections of organs.

When this better comparison becomes a reality, the percentage of successful transplantations in unrelated persons should soar. Even in kidney transplantation, cadaver donors have become by far the most common. About 40 percent of cadaver kidneys used result in recipients living two or more years.

Selecting cadaver donors on the basis of improved tissue-typing techniques should raise that figure to better than 90 percent.

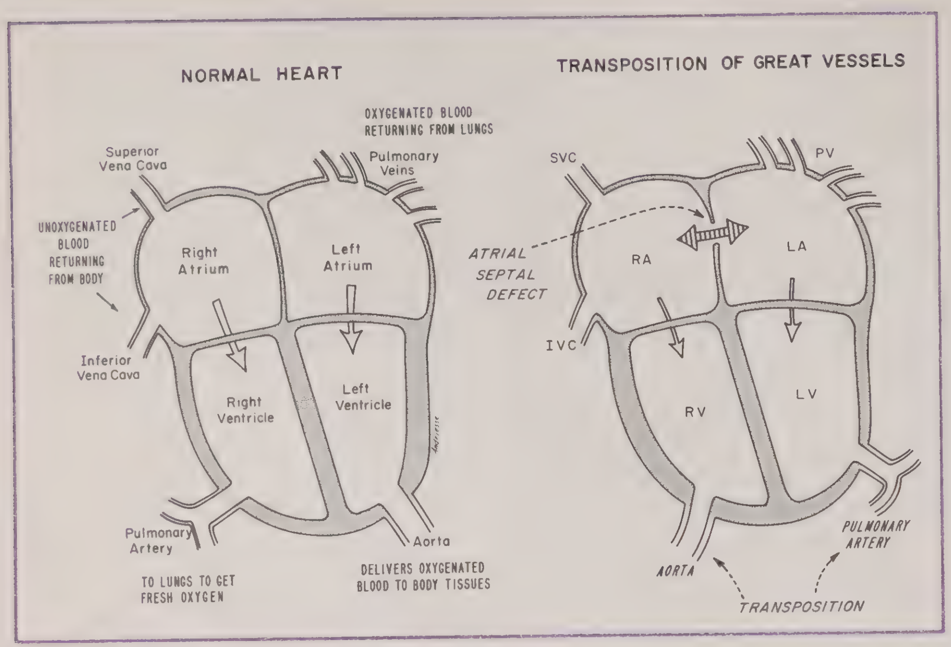
The state of organ preservation already permits physicians to take advantage of such improved typing. A kidney can be preserved for some 10 or 12 hours, long enough to be air-delivered to a recipient almost anywhere in the world.

Dr. Paul S. Russell, Director of Transplantation at the MGH, could telephone or teletype another region anywhere to say he has or needs a good kidney of a rare type.

Establishment of such a worldwide network would better the chances of finding a good match.

Dr. Henry Winn, left, and Dr. Bernard Amos look over charts while Dr. Marilena Fotino, research associate at the New York Blood Center, and Mrs. Karla Stenger, Dr. Winn's chief technician, examine serum. The scene took place at an MGH workshop at which experts in tissue typing gathered from the East, South and Midwest to work toward standardizing procedures designed to select good donor-recipient matches for transplantations.

Trinidad Boy Revises World Medical History by



(Continued from Page 1)

four heart chambers (the right atrium). From the right atrium the blood passes to the chamber below (the right ventricle) and out of the heart to the pulmonary artery.

The pulmonary artery then brings the dark blood to the lungs where it takes on a supply of fresh oxygen that gives the blood a bright red look. From the lungs, the pulmonary veins carry the life-giving, oxygen-bearing blood to the top left chamber of the heart, the left atrium.

The left atrium pushes the blood to the chamber below, the left ventricle, which squeezes the blood into the body's largest artery, the aorta. This oxygen-rich blood then journeys through the body to provide nourishment for all the tissues that make up a human being.

In transposition of the great vessels, nature plays havoc with this normal circulation. Thus, Winfield was born with his aorta and pulmonary artery reversed.

Instead of emerging from the right ventricle and entering the pulmonary artery en route to the lungs, the unoxygenated blood exited from the right ventricle to the aorta.

The aorta was therefore carrying oxygen-depleted blood through the body in a vain effort to do the work of oxygen-rich blood.

And instead of carrying oxygenated blood to the aorta, the left side of the heart was pushing its oxygenated blood out to the pulmonary artery. Despite its rich oxygen content, this blood was going back to the lungs for still another supply. Meanwhile Winfield's body was bluish (cyanotic) for lack of red blood.

In the 1950s surgeons developed a procedure in which they open a hole between the two upper chambers of the heart, enabling a little oxygenated blood to flow through and be carried out the aorta to nourish the body. This procedure helped buy a child time, but only relieved the symptoms somewhat. Without something additional, he would die in a few years.

Winfield never needed this palliative procedure. In addition to transposing his great vessels, nature also provided him with the very type of hole that surgeons devised.

This combination of transposition and a hole or defect between the upper heart chambers is called type-one transposition.

"Type-one transposition," said Dr. Allan Goldblatt, children's heart specialist at the MGH, "is the leading cause of cyanotic heart disease in the newborn.

"Up until the time of palliative surgery in the '50s and corrective surgery in the early '60s, there was nothing at all you could do for these children. They almost all died as newborns. Within the first six months of life, 99 percent of them were dead."

The corrective procedure referred to by Dr. Goldblatt was devised by Dr. William T. Mustard of Toronto. Surgeons had found that relocating the aorta and pulmonary artery to the normal positions presented serious problems.

What Dr. Mustard did was to devise a way of detouring the blood.

"Dr. Mustard pointed out," Dr. Buckley said, "that since we can't reroute the blood coming out of the heart, we can reroute the blood coming into the heart, so that we can also change nature a little to compensate."

While the heart-lung machine was operating, Dr. Buckley opened Winfield's heart and got rid of the hole-marred wall between its upper chambers. He removed the pericardium, the sac which normally encloses the heart, and sewed it so that it became a new wall inside the heart.

The new wall actually ended up forming a tunnel. Now the tunnel reroutes Winfield's blue, unoxygenated blood into the upper left chamber and the oxygenated, red blood returning from the lungs comes back to the upper right chamber.

The result is that the blue, unoxygenated blood goes from the upper left chamber to the lower left chamber, to the pulmonary artery, to the lungs where it gets fresh oxygen. And now the return trip carries oxygenated blood via the pulmonary veins to the upper right chamber, to the lower right chamber, and then into the aorta. The oxygenated blood thus flows throughout the body to nourish the tissues.

"What has been done," Dr. Goldblatt said, "is to reconstitute the circulation between heart and lungs. The right side of the heart is for the rest of his life going to work like the left side does in the normal heart."

After the surgery, Dr. Goldblatt and Dr. Myron B. Laver, an anesthesiologist, spent long hours with Winfield.

"Everyone thinks these children just bounce back after the surgery, and they are all over it," Dr. Buckley said. "Actually they need tremendous moment-to-moment care because of the alteration in their pulmonary physiology. Dr. Laver stays two or three days in the hospital with such a patient.

ving to Age 14

"It is this dedication on the part of the anesthesiologist that gets a child through the postoperative period."

After about two weeks in the MGH's Children's Service, Winfield is back with his family in their Dorchester home.

Because the procedure performed on his heart is comparatively new, physicians cannot be certain about his long-range outlook. But they are cautiously optimistic that he will be able to lead a normal life.

A Family Crusade

Getting Winfield Williams the proper medical care has been a crusade for his family.

Mr. and Mrs. William Williams and their children lived in Trinidad, British West Indies. When Winfield began to show signs of tiring easily and developed blueness of skin, his parents took him to see a famous heart specialist, who correctly diagnosed the problem. The specialist said no procedure was yet available to treat the condition. He gave Winfield only a few years to live.

One-half year later, when Winfield was 2, his father booked passage on a ship bound for England. Winfield's ailment made breathing difficult under normal conditions, and the rough sea voyage added to his woes. Mr. Williams ended up propping his son on his lap for much of the 13-day trip because he was told that body motion from his own breathing would help the boy to breathe.

But an examination in London merely confirmed that nothing could be done. Mr. Williams sold a small property he had, to pay for the cost of the trip and the diagnostic tests.

In the 1960s, after a procedure was developed to treat patients like Winfield surgically, the Williamses decided to come to the United States with their nine children. Mrs. Williams came first, settling in Cambridge in March of 1968.

She took a job as a nursing assistant at the Massachusetts Eye and Ear Infirmary. When she earned passage for her eldest son, he came and found a job.

With savings from their combined salaries, Mr. Williams followed in February of 1969. Their pooled savings enabled four more Williams children to come in May of 1969. Finally, the youngest four including Winfield arrived last August 3.

'Deserves the Right'

"I feel," Mrs. Williams said, "that Winfield deserves the right to have a normal life like everybody else."

Surgery was scheduled at the MGH and the state's Crippled Children's Services agreed to pay medical bills that go beyond Blue Cross and Blue Shield coverage.

A few days after the surgery, Winfield telephoned his mother from the hospital's Children's Service to announce:

"Mummy, I'm feeling just great. I walk all over the corridors, and I don't get tired."

Said Mrs. Williams: "This made me feel that all the years of seeking treatment were worthwhile."

Mrs. Williams and Winfield look over a Trinidad publication while Winfield was recuperating from open-heart surgery at the Children's Service of MGH.

Can Brain Dysfunction Cause Poor Reading?

(Continued from Page 1)

A second phase of this basic research seeks to learn whether some of the reading disorders are inherited. This genetics project is under the direction of Dr. Leon Eisenberg, MGH Chief of Psychiatry, and Dr. Barton Childs of Johns Hopkins Medical School.

Evidence of Inheritance

"We want to bring the family members and the children themselves into the laboratory and do the testing," Dr. Conners said. (He is also an Associate Psychologist at the MGH and Associate Professor of Psychology at Harvard Medical School.)

The researchers have already accumulated a little evidence to indicate that poor reading is inherited in some families. Should that prove the case, a child who inherited the poor reading characteristics would not necessarily be locked into a life of below-average reading ability.

"The brain is plastic," Dr. Conners said. "It has alternate routes to reach the same end.

"Maybe the right parietal lobe can take over by using, for example, a combination of audio and visual techniques. Once you know a defect, you may be able to plan routinely how to remedy it."

By using the flashing light method, Dr. Conners hopes to determine whether a given youngster, who has been classified in school as a poor reader, has a parietal lobe problem, and whether such children may profit from special education.

Chemical Defect Sought

Much better, however, would be a simple test to screen all youngsters for such a problem at an early age.

Dr. Childs is looking for some chemical defect in such children. Finding one might open the way to a simple screening test.

"That is not pie in the sky," Dr. Conners said. "Any inherited effect operates through the genes which in turn operate through cellular constituents and metabolic pathways, and therefore may be reducible to some form of biochemical test.

(Concluded on Page 6)

(Continued from Page 5)

"Early detection might be considerably improved by such a simple physical technique. If defects appear early – and they very likely do – one might be able to select out high-risk candidates very easily."

Whether a genetic defect will become significant often depends on environmental contributions to the problem. Thus, a child born with the form of mental retardation called PKU (phenylketonuria) avoids mental retardation if he is placed early on the appropriate diet. Dr. Conners sees a parallel with correcting genetic defects through education.

Early Detection Imperative

"In general," he said, "the earlier special education takes place, the likelier the chance for success. If a child gets into the third or fourth grade without a severe reading defect diagnosed, it is usually difficult to help him.

"It is clear that children do respond differently to different kinds of instruction. It is therefore hoped that by early detection one could arrange the environment so that it could have minimum negative consequences."

One experiment with arranging the environment will be tried at the MGH this summer. Varying forms of instruction will be given children with different brain patterns of response to see which method works best.

The expanded *MGH News* circulation has now reached 79,000. Your patience and understanding are appreciated during the process of computerizing our mailing list.

C. Keith Conners, Ph.D., shows Lucia Ohanasian how to do test showing the steadiness of her hand while in motion. The motor steadiness test is one of a battery given youngsters taking part in reading research study.

Language Skills and the Brain

The part of the brain generally dominant for language skills, such as reading, is the left parietal lobe.

This lobe is located toward the top of the left half (left hemisphere) of the brain. Statements claiming more knowledge of the parietal lobe than its mere location, however, usually attract controversy.

Many scientists believe that the left hemisphere is dominant for speech and the right, for spatial motor functions. Even this rule, however, has variations.

Some left-handed persons have language dominance in the right hemisphere. On rare occasions researchers have even found a right-handed person whose right hemisphere dominates for language.

By checking the brain's responses to language-associated stimuli, researchers find that the left parietal lobe of bright children usually responds much more than the corresponding right lobe. This difference in response between parts of the two hemispheres becomes less distinct when duller children are tested.

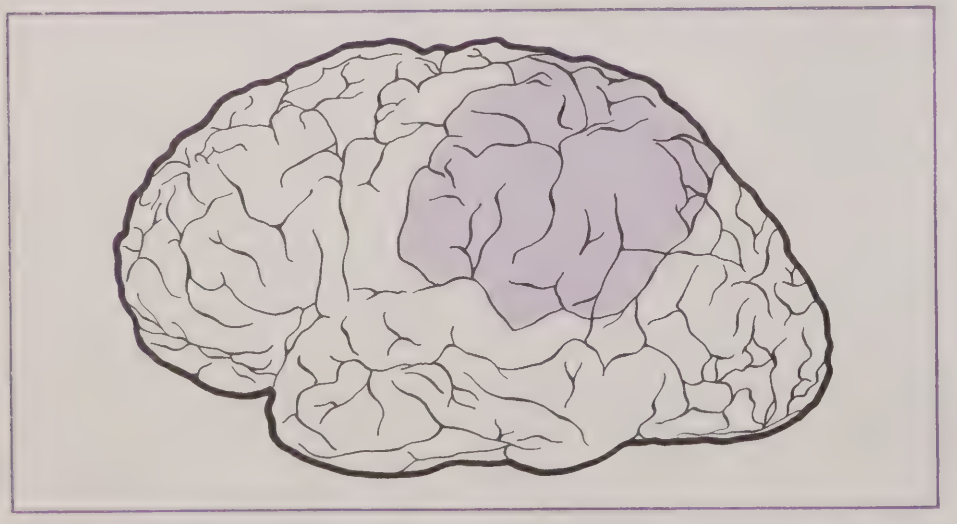
A depressant such as alcohol also tends to diminish the difference in response between the two hemispheres of a person's brain.

Through a built-in, fail-safe system provided by nature, the right hemisphere has the capability of taking over the speech functions from an injured left hemisphere. That capability, however, lessens with age. The reduction results from the fact that the tendency for the left side of the brain to become dominant for language develops fairly well by roughly the age of 10.

Thus, a 3-year-old who receives a penetrating head wound in his left parietal lobe may suffer little or no later effect on language. That same wound in an older child, though, would cause aphasia (a loss of language ability such as the power of speech, writing, or of understanding language).

Many scientists believe that dyslexia, a reading disorder, results from failure to develop a language dominance by either side of the brain.

Reading itself requires both language ability and an ability to observe symbols properly in space. For that reason, reading involves more than the skills available in the dominant hemisphere. A connection links the two hemispheres, providing the reader with the language skills offered in one hemisphere and the spatial skills in the other.



Left parietal lobe, outlined in drawing, is generally dominant for language skills such as reading.

Drs. Morton and Warren "Reenact" Drama

(Continued from Page 8)

Unfortunately, Josiah Hawes, a photographer who was to attend the demonstration, became faint and had to leave before he could photograph the operation and its participants. Therefore no pictorial account of the original operation exists, though numerous paintings and photographic reenactments were made after the fact.

Soon after October 16, however, pictures were taken of other operations with patients under ether in the amphitheatre. The anesthetizing was even more effective as Morton continued to improve his inhaler.

Photographs Help

These photographs as well as in-depth study of accounts and documents aided Mr. Wild in his reconstruction of the scene.

The operating chair appears in old photographs, as does the case of medical instruments and the partition that extended from the side of the semicircle of seats to the far wall.

The statue of Apollo Belvedere, the Egyptian mummy (a gift to the hospital in 1823), the half-circle shuttered window and even the molding around the lower edge of the dome are the same today as they were that fall morning. Dr. Warren's pincushion which held suturing needles, and the red plush operating table which appears on the edge of the diorama are on display in the Ether Dome.

To authenticate other details required more probing into the past. Mr. Wild obtained an old catalog of the medical instruments of the time, after which he patterned the tiny replicas in the case.

He studied the only existing floor plan of the Ether Dome and some of Charles Bulfinch's drawings of the exterior of the building. The windowed lantern, or top of the dome, as shown in the exhibit is covered today to allow the projection of slides during conferences that now occupy the amphitheatre daily.

The physical accuracy of Mr. Wild's model extends beyond the 1½-inch-to-1-foot scalings he made of every detail. Even the stairs in the tiers of seats appear worn in the diorama, witness to their 25 years of use by 1846!

Surgical operations took place in the room only until 1868 when a new surgery building was added to the MGH. After the Ether Dome was abandoned as an operating room, it served successively as a storage area, a dormitory for women students, a nurses' dining room, and, as it is today, a lecture hall. It was restored in the 1920s, and became a National Historic Landmark in 1965.

In his studies of the men present at the operation (the preparation to make the figures in the diorama accurate portraits), Mr. Wild learned much about the men in addition to their physical appearance. He became familiar with the controversy surrounding the use of ether. Dr. Crawford W. Long of Georgia had used an ether-soaked handkerchief to anesthetize a patient in 1842. But he didn't publish his findings for others to benefit from his experience until 1849. Dr. Horace Wells of Connecticut, also a dentist, had used nitrous oxide in 1844 for the same purpose, but when he had attempted to demonstrate his technique to MGH students in 1845, he was unsuccessful. Charles T. Jackson, a Boston chemist and geologist who conferred with Morton about ether, claimed its discovery as his.

But it was Dr. Morton's contribution that gave credence to the technique of inhalation of sulfuric ether to alleviate pain, and its acceptance by prestigious MGH surgeons that allowed the procedure to gain usage.

As early as December of 1846, Dr. Liston of London performed the first English operation under anesthesia and exclaimed, "An American dentist has used the inhalation of ether to destroy sensation in his operation and the plan has succeeded in the hands of Warren, Hayward and others in Boston. In six months no operation will be performed without this precious preparation. Rejoice!"

Indeed, as Dr. Warren pronounced after hearing Abbott say upon his recovery that he had felt no pain, "Gentlemen, this is no humbug."

To extend its research into the causes of reading problems the MGH's Child Development Laboratory is seeking as volunteers, youngsters with normal reading ability.

Each child who participates would have to spend about 30 minutes at the laboratory, including instruction time. Volunteers being sought are children between the ages of 6 and 12.

Dr. John H. Knowles points out to Mrs. Knowles one of the many realistic details of the Ether Dome exhibit on display on the second floor of Boston's Museum of Science. The Knowles gave the diorama to the museum on behalf of the hospital.

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Drs. Morton and Warren "Reenact" Drama

Once again, like that October day in 1846, Gilbert Abbott is ready to have a tumor removed from below his jaw by MGH's first surgeon and co-founder, Dr. John C. Warren. Young Abbott is noticeably not strapped into the red plush operating chair, a practice common and necessary to control a patient struggling against torturous pain.

The scene in miniature of the first public demonstration of the use of ether in an operation is a diorama, now a permanent exhibit at Boston's Museum of Science.

Robert D. Wild's reconstruction of the scene showing Abbott, six doctors and Dr. William T. G. Morton, a dentist whose experiments with ether in dentistry led him to demonstrate its use for the MGH surgeons, is a gift to the museum from Dr. and Mrs. John H. Knowles on behalf of the MGH.

Research Important

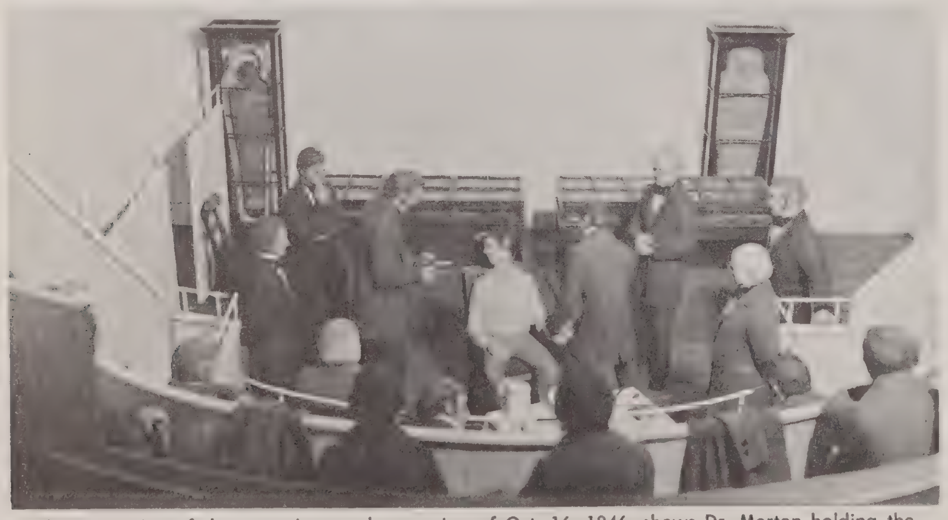
Mr. Wild, who said that research was a large part of the preparation of the diorama, was assisted in his efforts at historical accuracy by George H. Jacobsen, former MGH Editor-Archivist.

The significance for medical history of the events in the amphitheatre that morning is clear. Up until that time one of a surgeon's greatest attributes was speed. If a surgeon did not work quickly, a patient without benefit of anesthetic might die of shock. In England, Dr. Robert Liston was famed for being able to amputate a leg in 26 seconds, using two huge knives, scissor-style.

Who Was There?

For the most part, operations were confined to limbs and external conditions, because a patient could not stand the excruciating pain of internal surgery. Before ether, for example at the MGH in 1822, only seven operations were performed in six months. The introduction of anesthesia opened a new realm of possibilities to surgeons.

Although the importance of the event has long been established, the researchers' attempts at accuracy in physical depiction were not always as easy. Even deciding which doctors to include among the group on the floor of the diorama was difficult.



The re-creation of the operation on the morning of Oct. 16, 1846, shows Dr. Morton holding the ether inhaler after administering the anesthetic to Gilbert Abbott. Dr. John C. Warren stands ready, scalpel in hand (center right), to remove the patient's tumor, while house physician, Charles F. Heywood, takes Abbott's pulse.

Some are undisputable. Dr. Warren performed the operation, and Dr. Morton administered the pain-killer to 20-year-old Abbott. (Dr. Morton was 15 minutes late and almost missed the operation, after staying up all night making adjustments on his ether inhaler.) The diorama depicts the moment when Dr. Morton had finished administering the sulfuric ether, turned to Dr. Warren, and said, "Your patient is ready, sir."

Dr. Henry J. Bigelow of the MGH is among those who were definitely there. He had been attracted by newspaper accounts of the extraction of Eben Frost's tooth under ether, and had arranged for Dr. Morton to demonstrate his technique to the MGH staff. Mr. Wild also shows Frost, who had accompanied Dr. Morton to the operation to comfort the patient.

Painting Confusing

Reports then and for a long time afterward included many doctors as observers. Dr. J. Mason Warren, Dr. Warren's son, was reportedly present although he himself said he was in Lynn lecturing at the time. Mr. Wild's representation is, he feels, substantiated by extensive research. He shows Drs. Samuel Parkman, George Hayward, Solomon D. Townsend, and Charles F. Heywood. Medical students and observers appear in the tiers of seats.

Part of the confusion is caused by the familiar Robert Hinckley painting completed in 1893. (The painting hangs in the hospital's Moseley Rotunda, and a reproduction appears on the second page of the *MGH News.)* Hinckley shows a number of prominent Boston physicians, whom many authorities agree were not at the scene.

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MGH
News

Vol. 29 No. 5 MASSACHUSETTS GENERAL HOSPITAL, BOSTON, MASSACHUSETTS May, 1970

Diagnosing Diseases Before the Birth of a Child

Martha bore two sons who died by age 6 of an inherited disease.

She was pregnant again and feared her unborn child would inherit the same fatal ailment.

Her obstetrician referred her to a new MGH laboratory. After testing her, the laboratory assured her physician that the expectant mother had no grounds for fear.

The test showed the unborn child was a girl. Since the disease she had passed on to her two sons (chronic granulomatous disease) afflicts only males, there was no possibility her daughter would fall a victim.

Had the test proved the unborn child a boy, Martha could have had a therapeutic abortion under Massachusetts law – provided that any two psychiatrists and an internist believed that bearing another doomed child would have threatened the mother's mental health.

The test made on Martha was done at an MGH laboratory that opened unannounced on a pilot basis in January. The Prenatal Genetic Diagnostic Laboratory is the only one in New England equipped to do the primary studies to determine whether an unborn child has an inherited disorder caused either by faulty chemistry or a defective piece of one of the strands of inheritance (chromosomes). The MGH laboratory has now opened on a regular basis here, but will move soon to larger space at the Walter E. Fernald State School in Waltham.

"There has been a veritable explosion of knowledge in the last two years about diseases that can be diagnosed

(Continued on Page 2)

Searching for Elusive Human Cancer Viruses

(Fifth of a Series on Basic Research)

For decades scientists have been searching for proof that viruses cause some kinds of human cancer.

Various laboratories have nailed viruses as the cause of some animal cancers. But a human cancer-producing virus remains elusive.

At the MGH, Dr. Paul Black is attacking the problem in several ways. In the first phase he is studying in animal cells the biochemical steps in the change from normal to cancer cells. He places normal cells from animals into a test tube and uses cancer viruses from animal cancer cells to transform the normal ones into cancerous ones.

By doing this in a test tube, the scientist simplifies the number of variables which may be involved. He avoids adding unknown dimensions that are present when doing research on an intact animal. Among the variables he avoids are the many effects of the animal's inheritance and of its immunity to cancer.

Dr. Black's group has developed ways to measure the number of cancer cells that form in a given time span. They can tell whether, say, 10 cells or 20 become cancerous over a period of time.

"This enables us," Dr. Black said, "to see what the events are that either slow down the cancer process or speed it up or prevent it, so to speak. We can see what events may predispose the cell toward cancer or what events protect it and make it more resistant to cancer.

" . . . We're analyzing enzymes that are increased after a virus infection in order to get some insight into the disturbances of the regulatory processes by which normal growth control goes on.

"A cell has orderly and normal growth control that is maintained by processes called homeostatic equilibrium. Normal mechanisms of checks and balances within the cells keep the growth orderly and controlled. When a virus gets in and upsets this balance, the cell may either die, or it may become transformed [to cancer].

"We're more interested in the transformation so the early steps in the proc-

(Continued on Page 4)

Dr. Aubrey Milunsky removes from a roller machine a bottle in which human cells are growing in mass. This apparatus, situated in a warm room, constantly rotates the bottles, so that the cells adhere to the sides.

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Planet Earth Doomed to Destruction?

Perhaps the most frightening prediction for Planet Earth since the apocalypse comes in a page 8 article. Dr. John Platt's Cassandra-like views will not earn him friends. One person always sure to win more enmity than the bearer of bad tidings is the diviner of doom. What makes Dr. Platt's predictions especially frightening is that they stem from scientific sense rather than either Delphian obfuscation or mystical intuition.

In short, Dr. Platt examines the exponentially expanding problems of the world. He finds them so out of control that he believes the planet may not even survive to reach the year 1984 of George Orwell's novel. Dr. Platt's one glimmer of hope comes in the form of a challenge flung at scientists and social scientists. He pleads with them for a massive effort to initiate research designed to solve or at least control the world's ills.

The *News* applauds Dr. Platt's stand and agrees with his call for research on critical problems to go on crisis footing. The cooperation of scientists and social scientists is essential. But so is that of the government. Without federal funds to finance such an all-out effort, and the federal government to encourage it, such research would be doomed. So would the world.

Massachusetts: An Archaic Abortion Law

A page 1 article in this issue describes a new MGH laboratory equipped to determine various abnormalities in unborn children. In the past two or three years the number of fetal abnormalities detected has increased dramatically, enabling physicians and their patients to determine if therapeutic abortion is indicated. Unfortunately, Massachusetts law has failed to catch up with science. To secure such an indicated abortion here, a woman needs two psychiatrists and an internist to certify that bearing a child will threaten her mental health. The certainty or near-certainty that the fetus is defective is not enough.

In practice a woman who learns from a test that she is carrying a diseased child can even now get an abortion. She need only find permissive psychiatrists. But shopping for three physicians can prove a costly process – one that works further hardship on the poor, the very people least likely to know where to turn.

Even under present law, the new MGH laboratory represents a big improvement in the care available to pregnant women in New England. However, its full impact would better reach all the people desiring abortion if Massachusetts changes its archaic law. Certainly a woman who has these indications for abortion should need no further grounds than the proof she is carrying a defective child.

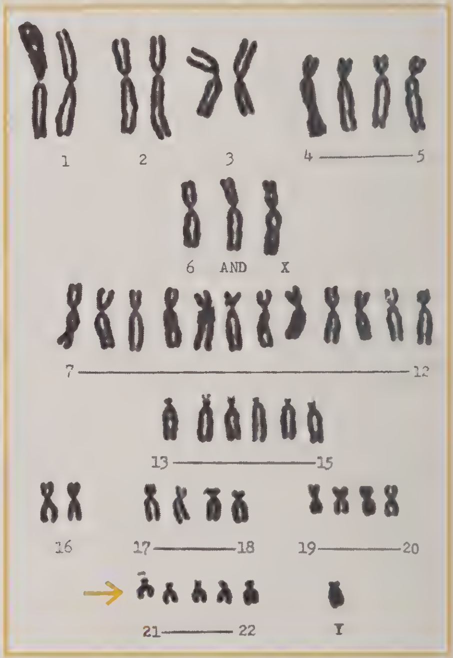
Before Birth

(Continued from Page 1)

before birth," said Dr. Aubrey Milunsky, Director of the new laboratory.

Mongolism, a common type of mental retardation, is an example of a condition that can be reliably diagnosed before birth. The chance of a pregnant woman bearing a mongoloid child increases dramatically with age.

More than half of the mongoloids are born to women more than 35 years old. A woman between 35 and 40 has one chance in 290 of producing a mongoloid. In the age 40 to 45 range the odds become 1 in 100, and above 45 the chances are 1 in 38.



This is a "karyotype" showing three number 21 chromosomes (strands of inheritance) instead of the usual two. The extra number 21 (pointed out by arrow) shows the child is a mongoloid. This is the sort of information obtainable by the new MGH laboratory from a culture of fluid cells removed from the amniotic sac of the unborn child.

At a laboratory like the new one at MGH every known disease caused by defective chromosomes can now be diagnosed with certainty before birth. All together these disorders strike 1 in 200 children regardless of the mother's age at the time of birth.

Even the defect of the so-called supermale (XYY), who studies indicate are found in much higher ratios in prison than in the general population, is now diagnosable prenatally.

In addition, the MGH laboratory can diagnose about a dozen inherited diseases caused by chemical problems. Some, like Tay-Sachs disease, always result in death at an early age. Fortunately, the chemical problems are much more rare than the chromosomal ones.

In the short time the MGH laboratory has been open, 12 mothers have been tested. Despite their fears, none of the dozen seen so far has been carrying an abnormal child.

The tests have in these cases served to allay the fears of the patients.

"This is crucial," Dr. Milunsky said. "Almost every woman at some time during pregnancy – whether for an hour or even the entire nine months – fears that she might produce a deformed or defective child. When this has happened once or twice, the kind of depression or suicidal tendency that may supervene could have disabling or even disastrous consequences."

A threat to the mental health of the mother remains the only grounds for a legal abortion in Massachusetts. For a woman to get approval, two psychiatrists and one internist must certify that mental problems are likely for the expectant mother unless the child is aborted.

Even for a parent who accepts the idea of abortion the issue of whether to seek one is not always clear-cut. For example, some diseases such as hemophilia, that are inherited only by males, are not definitively diagnosed by the present techniques.

The so-called bleeder's disease occurs only in males but is carried by females. If a known carrier is pregnant and the test reveals she is bearing a girl, the mother's fears are therefore allayed.

Should the prenatal test prove the fetus to be a boy, there is one chance in two that he will be a hemophiliac. The mother's decision to seek an abortion would have to be based on the 50-50 chance rather than the certain diagnosis that can be proved with mongolism.

Another problem arises when the test shows the unborn child has a treatable but incurable disease like galactosemia. By placing such a child on a milk-free diet from his day of birth he should avoid mental retardation.

The parents must decide whether they want to bring such an infant into the world. Dr. Milunsky believes that a mother should seek a test only if she is prepared to have an abortion should the results prove positive.

"There is no sense in taking the risk of the test if you are not going to do anything about it," he said.

Called amniocentesis (February 1969 *MGH News*), the procedure carries only a small risk when done by specialists. A March 12 *New England Journal of Medicine* article cites 287 cases performed early in the second trimester of pregnancy without evidence of fetal or maternal complications.

The method of amniocentesis was devised in the early 1930s. Until recently, it was used mainly in the management of erythroblastosis fetalis (Rh disease). In the procedure, the amniotic fluid is drawn into a syringe through a needle inserted under local anesthesia through the woman's abdomen into the amniotic sac which surrounds the unborn child. Since this fluid contains the child's cells, the test proves as reliable as if it were done after his birth.

Dr. John W. Grover, Chief of the Ambulatory Clinic at the MGH's women's unit, Vincent Memorial Hospital, or another referring obstetrician, need remove only a tiny amount of fluid (5-10 milliliters or about the equivalent of 2 teaspoonsful).

Dr. John W. Littlefield is director of the MGH Genetics Unit, parent organization for the new laboratory. Dr. Milunsky is Research Associate in Neurology at Harvard Medical School and Assistant Professor of Pediatrics at Tufts University School of Medicine.

"It costs about $4,000 per year," Dr. Milunsky said, "to keep one mongoloid institutionalized in Massachusetts. Approximately 3,000 of them are institutionalized in Massachusetts today.

"It is not possible to know how long they will live. However, if you compute the cost for their expected life span, it comes to $180 million for the total care of mongoloids presently in institutions in Massachusetts alone.

"That's only mongoloids, of course, and only the ones in institutions.

"In addition there are a large number of mongoloids kept at home, a recommended procedure nowadays. The personal tragedy to the families is phenomenal. It seems to me that no one today need have a mongoloid."

Criteria for Testing Of Pregnant Women

The hospital's new Prenatal Genetic Diagnostic Laboratory will accept two types of pregnant women for testing:

1. Those who have a family history of certain serious inherited diseases such as mongolism, Tay-Sachs disease, or hemophilia.
2. Those who are 40 years old or more, because of the increased likelihood that older women will bear mongoloids.

Stage of pregnancy is very important. About the 16th week of gestation seems best for performing the procedure.

"Doing it too early, for example around the 13th week," Dr. Aubrey Milunsky said, "seems too hazardous to fetus and mother. Doing it later, say after 20 weeks, makes therapeutic abortion impossible under law. Certainly it makes abortion more dangerous."

A woman who wants a test performed should first consult her own obstetrician, who should then contact Dr. Milunsky. The laboratory informs the referring physician of test results. He then explains them to his patient or asks the laboratory to.

While counsel is given by a physician, the decision to seek an abortion always remains with the parents.

Dr. Milunsky adjusts a device used to count human cells that have been grown in tissue cultures.

Proving Virus Link in Animals Much Easier

The MGH has a number of groups in addition to Dr. Black's who are attacking the problems of cancer from various angles. Many of these researchers are concentrated in the J. Collins Warren Laboratories of the Huntington Memorial Hospital.

Dr. Paul C. Zamecnik, Director of the laboratories, last month won the prestigious Passano Award given by the Passano Foundation, a nonprofit corporation with the purpose of encouraging medical science and research. Six of the previous 30 winners have gone on to receive the Nobel Prize.

Dr. Zamecnik has summarized much of what is going on in viral cancer research in the annual report of the laboratories. The report in full will appear in the new MGH annual report which will be published this summer. The preamble of Dr. Zamecnik's report follows:

The most exciting news in cancer research at the present moment is the growing evidence that in many species of animals – fish, frogs, birds, mice, rats, cats, dogs, cattle, and monkeys, to name a sampling – cancer can be shown to be caused by viruses. Such viruses, generally specific for a given species, can be purified, studied, grown in tissue culture, and injected into others of the same species to produce cancer in a previously normal animal. This statement does not deny that cancer can also be produced in many species of animals by chemical. For example, the same compounds – 3,4-benzpyrene, and 1,2,5,6-dibenzanthracene – which can produce cancer in man from smoking, can likewise do so in the mouse either when painted on its skin or injected. There is, however, fresh, convincing knowledge, added to other classical information, that an important natural cause of cancer in animals is a family of special viruses.

At least some of these viruses possess the unusual attribute of being passed from generation to generation by way of the mother's ovum, via her milk, and possibly by means of the paternal sperm cell. Thus, they would be difficult to eliminate. They may also exist quietly in the host animal for long periods of time, doing no harm, but destined to waken to action as a result of some unknown stimulus.

This concept of cancer in animals gives strong direction to the search for a viral link to cancer in man. From the point of view of one immersed in the problem, it appears almost inevitable that, in time, the missing evidence to tie an important sector of human cancer to viruses will be uncovered. The establishment of a link in animals has been a much easier problem. Here one searches for the virus in an animal tumor which occurs naturally, purifies and concentrates the virus, and injects it into a newborn animal of the same species. In this way the connection has been established for the mouse leukemia and solid tumor viruses and for the various chicken tumors. In the human we must follow a more circumspect experimental path (since a suspected tumor virus cannot be injected into another man).

In our laboratories we are addressing ourselves more sharply than in previous years to the question of how an animal virus is able to invade a normal cell and to convert its law-abiding machinery into a wild anarchic type of growth. We may ask how the virus diverts the steps which run from gene to completed cell product into a population explosion of tumor cells. What regulators keep the normal cell family size within bounds? How can one prevent the production of more tumor virus without killing the host in the process? Can one produce effective viral antibodies against cancer? These are questions which are worth examination, and toward which we are turning biological insight gained in the study of normal growth.

DR. PAUL C. ZAMECNIK

Elusive Cancer Viruses

(Continued from Page 1)

ess of transformation should tell us what goes wrong and where the control mechanisms go awry."

Thus, when the normal restraints on growth are lost, unlimited growth begins. That unlimited growth is cancer.

"By studying the abnormal," Dr. Black said, "we may gain some insight into normal control mechanisms . . . and we can try to analyze what changes in the biochemistry of the cell go on during transformation."

Various researchers have found they can only change a normal cell into a cancerous one by exposure to the virus at the stage when the normal cell is dividing to reproduce itself. Such reproduction goes on even in mature humans to replace worn out or destroyed cells.

Many cancer, as well as normal, viruses have as their core the coded genetic substance DNA that tells the cell how to make a copy of itself. Normally a virus's own DNA makes a coat out of protein to enclose itself.

When the tiny virus slips into a healthy cell, this protein coat makes the virus a complete one capable of expressing itself by infecting and killing the cell.

When a normal cell becomes cancerous, the belief is that the viral DNA becomes a hereditary part of the normal cell's own DNA and does not make a virus protein coat. This incomplete virus enables the cancer-infected cell to flourish, and the viral DNA replicates along with host DNA.

Various laboratories have been examining human cells for a virus capable of infecting other cells.

"I don't think they are finding any infectious virus there because the virus is incomplete and not expressed," Dr. Black said.

Scientists do not understand how the building of the protein coat is repressed. But they do have some circumstantial evidence that leads them to believe they are on the right track in thinking that the viral DNA persists in the viral-transformed cancer cell to produce cancer.

Investigators, including Dr. Black, have found new antigens, foreign proteins, that are made in the cancer cell presumably from information supplied by the viral DNA.

These antigens are like footprints that hint that the elusive virus was present in some, probably incomplete, form.

The prime question is how to trick the incomplete virus into expressing itself as a complete one, capable of infecting and causing the death of a normal cell, and thus offering proof that a virus is indeed present in some human cancer.

Dr. Black, an Associate Professor of Medicine at Harvard Medical School, is using two methods in trying to entice human cancer cells to show in the test tube their true nature.

One seeks to mate the cancer cell with a normal cell in which the virus will grow. If the cells mate (a process called fusion), the viral DNA is free to make its protein coat and become infectious. Certain substances (like the Sendai fusion factor) from viral coats enhance the mating process.

The second method employs certain chemicals such as an anticancer drug called mitomycin C. The scientist puts human cells into the test tube and uses the chemical to try and pull out the viral DNA and the cell's own DNA, which is believed attached. This process, successful with some animal cancer viruses, allows the viral DNA to build a protein coat and become infectious so that it can reproduce itself.

Theoretically at least, the trick would also permit scientists to use the virus taken from one cell to infect and transmit genetic information to another. This process is called transduction. The infected cell would then take on some of the genetic or inherited characteristics of the original one.

A portion of Dr. Black's laboratory where research is being carried out on the possible relationship between the virus and human cancer. From left, Lloyd Culp, Ph.D., Gay Tracy, Jeff Collins, a graduate student, and Cynthia Dixon are among those who are working on various aspects of cancer research. Other members of Dr. Black's research group are Dr. Martin S. Hirsch, Dr. Henry Rothschild, and Joan Kaplan, Ph.D.

Dr. Black examines animal tissue cells grown in test tubes to compare normal cells with those which have been transformed into cancerous ones.

"This is a long, long way off," Dr. Black said. In the very distant future, however, it might be possible to correct an inherited defect by getting genetic material from cells from a normal human into the cells of the person with an inherited disease by means of a virus.

Dr. Black's work is pure science aimed at finding basic truths. From basic research such as his, however, it is possible to envision practical results.

If a cancer-causing virus turns up in humans, it should be possible to vaccinate people to build up antibodies that would fight off that particular virus.

Such a vaccine, however, would prove useless against cancers caused by other types of virus.

"There may be many viruses that cause cancer," Dr. Black said. "Is breast cancer caused by a breast cancer virus? Is skin cancer caused by a skin cancer virus? We don't know. It is just premature to even guess at the number of viruses that might be involved or whether certain viruses go to certain regions of the body as polio goes to the central nervous system."

Another fact dictates against any one vaccine "conquering" all kinds of cancer. Viruses, even if proved as a cause of cancer, would still remain just one cancer-producing agent.

Other triggers include X rays, ultraviolet light, and chemicals. Excessive or critically placed amounts of all these can damage the heredity DNA and alter its normal cell production.

One theory states that normally animals, including man, have mechanisms that within limits can repair the damage induced by some of these agents. It is believed that chemicals called repair enzymes cut out the damaged piece of DNA. The remaining DNA then forms a healthy new piece that takes its proper place.

The envisioned process would be much like snipping out a bad section of electric wire and taping a new piece into place. Dr. Black's group is searching for the hypothetical enzymes.

In some diseases people apparently lack this repair mechanism. An unusually high incidence of cancer may result in these people.

In still another study, the MGH group and MIT are together examining the surface of the cell for new antigens.

Normal cells stop dividing when one cell touches another. This is called contact inhibition. Not so in the cancer cell. What's more, the normal cells extend out in a single layer like a network of wire mesh.

Cancer cells continue dividing and pile up on top of one another. As a result, the MGH-MIT group has estimated as many as 25 million cancer cells in the same dish that can hold only one million normal cells.

What makes the surface activity differ in the two types of cells? The local scientists have found that the surfaces of cancer cells contain lesser amounts of certain sugars and substances called aminosugars.

"We think these sugars, aminosugars and glycoproteins are important in establishing a normal cell-to-cell relationship and that there is a disturbance in their formation in cancer cells," Dr. Black said. "This is speculative, but a lot of people believe it."

Dr. Knowles Urges Wider Role for Medicine

MGH General Director John H. Knowles has called on medicine to broaden its role along a variety of fronts.

In his annual report to be published this summer, he pleads:

"Medicine must play an expanded role in both the purely medical issues as well as the larger social, economic and political issues if it is to fulfill its ancient and honorable calling to improve and maintain the health of the people."

Dr. Knowles sees the health problem in Boston for the 1970s as "that of all the cities of the United States." He would make services available and accessible to those most in need. These services would stress health education, prevention and rehabilitation and early diagnosis and treatment.

Dr. Knowles sees an equally important adjunct to the health of city dwellers. He urges "the rejuvenation and rehabilitation of the city itself so that a healthy environment with clean air, fruitful jobs, more adequate transportation, education, housing, food and civil rights – food for the soul as much as for the stomach – will be available to all."

Dr. Knowles noted that some 45 million Americans qualify as poor. Of these, 25 million live in cities. Cited was a 1968 Boston OEO survey of 1,191 youths aged 16 to 21 among whom 31 percent needed more definitive diagnostic and/or treatment services.

On a more encouraging note, Dr. Knowles said:

"Our ability to diagnose, treat and prevent disease in this present era has afforded new hope to all levels of society." However, he added that, "rushing to improve service both in quality and quantity, we must not forget that costs in many instances simply must increase."

Pointing out that national health expenditures have doubled from $28.9 billion in 1961 to $60.3 billion in 1969, Dr. Knowles said:

"By all economic indicators the rise in cost of medical services has outstripped all other services, a particularly rapid rise over the past three years following the advent of Medicare. We now spend 6.7 percent of our Gross National Product on medical care."

Dr. Knowles deplored the uneven quality of care produced despite vast expenditures.

He also expressed concern at the medical indigency resulting from a 12 percent annual cost rise in medical care at a time wages have been going up only 3 to 4 percent annually.

"One is staggered by the fact," he said, "that the increase in personal health expenditures for the 19-year period 1950 to 1969 has been due largely to inflation. For example, 50 percent of the rise in health expenditures is due to price increase alone while 19 percent is due to the increase in population."

HEALTH UNIT
BUNKER HILL
HEALTH CENTER
MASSACHUSETTS
GENERAL HOSPITAL

"... We have established such a program in Charlestown."

Explaining why hospital costs have risen 17 percent in one year, he listed three reasons: 1. increased wages and fringe benefits consuming from 62 to 70 percent of the operating budget; 2. an absolute increase in the number of employees per bed needed; 3. increased costs of construction, equipment and supplies, both from inflation and the "development of new facilities and technology required for the best medical care."

Dr. Knowles posed what he termed a burning question:

"How to contain or reduce hospital costs and still render high-quality services to a public whose appetite is insatiable for the finest service and whose expectations and demands have never been higher."

Dr. Knowles listed five internal factors in containing costs:

1. Full utilization is the single most important factor. To maintain one patient in one bed costs about $40,000 a year.

"If we budget for 92 percent occupancy," Dr. Knowles said, "and fall below this figure each empty bed costs the public over $100 per day or nearly $40,000 per year. . . . The national utilization figures are around 80 percent as contrasted with our hospital's figure which approaches 95 percent."

2. Utilization review to prevent unnecessary admissions, unduly prolonged stays, and overuse of tests; and to assure high quality of care. Dr. Knowles praised the MGH Utilization Review Committee for "outstanding successes" in these areas.

3. Costs have to be identified and quantified through detailed and effective cost accounting. The MGH uses the "step-down" cost analysis technique recommended by the American Hospital Association and the Social Security Administration.

4. Management techniques to reduce turnover rates, reduce overtime work, improve working conditions, and utilize methods committees which use industrial engineers and systems analysts. Other such techniques include the use of automation and computers, employee incentive programs and the use of disposable products.

5. An all-inclusive per day charge to the patient and his third-party payer. This would replace the present "a la carte" piecework charging system

which requires itemizing every part of the patient's stay.

The MGH has proposed such a system and the federal government and various national organizations are considering the possibility. Dr. Knowles estimates that adoption of this proposal could save the MGH more than $500,000 and all American hospitals up to a half billion dollars in paper work.

He also listed four examples of cost-saving moves external to the hospital:

1. Regional planning to avoid development of unnecessary services and reduplication of costly facilities. Such planning encourages full utilization of regional facilities.

"Many of us at the MGH," the annual report states, "are involved in regional planning whether it be at the level of the State Department of Public Health or with the voluntary regional planning group recently established in Boston."

2. Fundamental changes are needed in health insurance plans to: stimulate the use of low-cost ambulatory facilities; provide for standards and quality and utilization control; and build in incentives to good management.

Dr. Knowles said that to date "third-party insurance companies, Blue Cross and government have primarily represented the hospitals' or the doctors' or the drug companies' interests and have not always put the consumers' interest first." He credited the Medicare law and some Blue Cross plans with at least making a step in the direction of needed changes.

3. The development of neighborhood health centers easily accessible in local communities can:

Decrease the expensive, fragmentary nature of the American health system; reduce hospital admissions by as much as 80 percent; establish money-saving disease prevention and detection programs; stimulate research into the health system and ways of enhancing the use of manpower. "This is a most important development in the MGH planning, and we have established such a program in Charlestown," Dr. Knowles said.

4. The development of better extended care, nursing home, chronic disease and rehabilitation facilities to reduce the use of high-cost, acute hospital facilities where possible by the early transfer of patients to lower cost facilities more appropriate to their needs.

"I can imagine our sense of insecurity becoming so great within a very short time — three years or five years — that all of our banks and downtown buildings would have solid concrete walls and all our homes in the suburbs would have steel shutters like the houses in Europe."

(Continued from Page 8)

points such that they might lead to explosions, or if we could possibly damp them down before those threshold points, they might become manageable.

One could name dozens of such cases – one is pollution with hue and cry, one is population – that have this character of a buildup and reaching possibly some point of no return. . . .

I would suggest that there are several ways of preventing these. There is, of course, the way of public concern: of writing letters to the editor or petitioning your congressman or electing a new one. . . .

There is a level of education, of trying to educate your children for this new world. Or trying to educate college students to have more understanding of democracy or more understanding of how to get things done when the system seems to flop.

Perhaps over a decade or so there will be substantial growth in world communication or in world interdependence in trade and industry which helps a bit, although I think not rapidly enough.

But the most important component, I think, has not yet been put into the effort, and that is the effort of scientists and technically trained people, analytical minds of all kinds in trying to design solutions for crisis problems; in trying to design new organizations for humane human interactions, more effective biotechnology for limiting population, for increasing food supplies – health. For scientists, in short, to begin to pay attention to the large-scale problems of the world and to bring to bear the same kind of library and laboratory resources, the same kind of analytical talent, that they would bring if there were a massive national emergency. . . .

I think that some important fraction of our brains needs to be put on methods of dealing with these crises [immediately] before they have blown up in our faces . . . I am talking about maybe 10,000 scientists out of 200,000.

I am talking about maybe a $1 billion effort of a total national research and development of the order of $20 billion. . . . The design of organizational mechanisms for helping scientists [with funding] work on such problems is an important next step.

If scientists work on such problems, one could imagine a number of seed operations or trigger operations which would have some effect on our crises. These seed operations will take a while to get into operation. . . .

It's my opinion that for some of our crises this time for mounting research . . . maybe in the range of one or two or three years . . . is comparable to a wartime urgency.

Dr. Platt suggested several examples of seed operations that might be begun on a crisis basis:

- *Research on a contraceptive that might be put in salt to be used by a woman who chooses not to have children.*
- *Genetic copying of prize animals.*
- *A massive Sesame Street program for 40-year-olds.*
- *Numerous pugwash-type conferences lasting year-round.*

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Biophysicist Begins Countdown on Civilization

A world-renowned biophysicist stood before an MGH group the other day and began a countdown on civilization.

Addressing the MGH Committee on Research, Dr. John Platt said he gave the world less than a 50-50 chance of surviving the next 10-to-30 years. And long before the end he sees America becoming a land of fear.

"I can imagine our sense of insecurity becoming so great within a very short time – three years or five years – that all of our banks and downtown buildings would have solid concrete walls and all our homes in the suburbs would have steel shutters like the houses in Europe."

But Dr. Platt sees a glimmer of hope. The Associate Director of the Mental Health Research Institute at the University of Michigan called for a massive effort of wartime urgency to research changes that could lessen the crisis.

The author of a Science *magazine article on the subject, he suggested a few examples of the sort of research demanded and gave scientists and social scientists no more than three years to mount that research.*

Excerpts from Dr. Platt's speech follow:

The great age of exploration is over. At the same time and in somewhat the same way the age of evolution is over. I mean evolution by natural selection. . . . From now on the directions and speed of evolution on the earth will be determined in large measure by human activities.

. . . It is quite false to compare this age to some past age of change or some past age of unrest. . . . These are changes more rapid and faster and larger than any changes ever before in the history of the world. . . .

When you have had changes on this scale, you will not get them again. We will not have another factor of 10^7 in our speeds of communication in the next century because we are now communicating with the speed of light and physics says that is as fast as you can go.

We will not have another factor of 10^2 in travel speed, because we are now traveling so fast, we travel out of the atmosphere out into orbit. . . .

"It is clear that within a time of the order of 200 years at the present rates of our population growth, if they continue, we would be reaching densities of the order of 100 times our present densities — in the order of 400 billion people. . . ."

It is clear that within a time of the order of 200 years at the present rates of our population growth, if they continue, we would be reaching densities of the order of 100 times our present densities – in the order of 400 billion people, far beyond any human level, and beyond the capacity of any visible food supply from the sun, and in fact I think that the population leveling with our present pressures may come not in 200 years, but rather in 20 or 30 years.

So that this is, in fact, the time of decision. . . . And, in short, we are in the process of building . . . a new world society . . . and the decisions that are made in this short-transition time, a time which is short even compared to a generation, are the decisions which to an enormous extent will determine the kind of world our children and grandchildren will live in in the next century and quite probably for centuries to come.

The result is that the next 10 or 20 years are extremely crucial times. I'm not going to be dogmatic about whether this time band of decision is 3 years, 10 years, 20 years, 30 years. I have said I think we have less than a 50-50 chance of living until 1980. . . .

It is clear that the time is short. It is clear that human institutions, not being prepared to deal with these problems, are stressed as never before. . . . And so, they are multiplying our crises and the stress on our present administrative and democratic processes which were designed for a slower age and an age which did not have instant communication, instant outrage.

In short, I think now to make the time chart on a shorter scale there are pressures building up over the next few years which may easily pass threshold

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MGH News

Vol. 29 No. 6 MASSACHUSETTS GENERAL HOSPITAL, BOSTON, MASSACHUSETTS June-August, 1970

Project Omega: Probing Fatal Illness and Suicide

Joan denied she intended suicide when she gulped half a bottle of tranquilizers.

It was obvious, however, that deep depression gripped her.

After treating her, the MGH Emergency Ward telephoned a member of Project Omega. Believed unique in the world, Project Omega is an MGH research program investigating both suicide and terminal illness.

"The more knowledge we have about suicide and terminal illness," Dr. Avery D. Weisman said, "the more intelligently we can make recommendations to apply to more people."

Funded by the National Institute of Mental Health's Center for Study of Suicide Prevention, the two-year-old project has been at work quietly attacking the problem on a broad front. Besides directing the project as Principal Investigator, Dr. Weisman serves as President of the American Association of Suicidology.

"We've tended to think of suicide," he said, "as purely a psychiatric problem, and it isn't. It's a community-wide problem.

"And we tend to think of incurable illness as purely a medical problem. It, too, is a community problem, because we've overlooked the families that are involved. We've overlooked the disruption that occurs with the death of a significant person in the family. And we have made very little effort to try to understand it and see what the processes are."

What makes Project Omega unique are the tools used and its broad scope employing many kinds of skills for its

(Continued on Page 4)

Infant's Diet – In Need of a Major Overhaul?

(Sixth of a Series on Basic Research)

Are pediatricians and parents producing a race of fat, lazy people with shortened life spans?

The Chief of the MGH Children's Service's Metabolic-Endocrine Unit thinks this may be so. But Dr. John D. Crawford admits that his evidence is not conclusive.

Yet his own research and that of many other scientists have made him wonder whether America is building obsolescence into its infants the way manufacturers build it into automobiles. Dr. Crawford wants his fellow pediatricians to think seriously about revising the diets of their young patients.

"I'm at the point of questioning present practices," Dr. Crawford said. "This spirit of keeping up with the Joneses by having an infant gobble up his formula to produce a better looking growth chart may be leading us astray."

Dr. Crawford's research began with some observations of a type many people have made.

"Clothes from the Revolutionary time will hardly stretch over an 8-year-old now," he noted. "We live longer, but life expectation . . . is better in this part of the world because of a huge reduction in infant mortality.

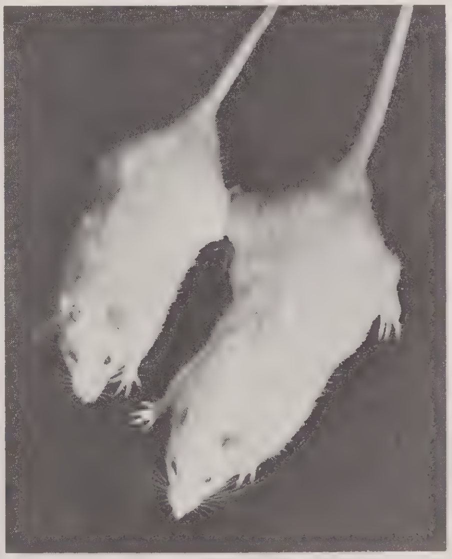
"But if you look at life expectancy on reaching the 21st birthday, you find it either unchanged, or not quite as good as it was in 1900, as far as I can make out from the best available figures."

From such general observations often come research projects concerned with basic truths. In Dr. Crawford's case a sabbatical year spent in Prof. R. A. McCance's Department of Experimental Medicine at Cambridge University in England further stimulated his interest.

Dr. Gordon C. Kennedy there, as well as others, had been using rats as experimental animals. He used the now classic technique in which the offspring of two females who had litters the same day were mixed to eliminate any bias from inherited or prenatal factors.

He would then place most of the rat pups in a cage with one mother and the rest with the other. Under this random grouping, 18 pups might end in one cage and only two in the second.

(Continued on Page 6)



Both adult rats were born the same day. The only difference in feeding came during preweaning days when the one on left had to compete with a large litter.

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EDITORIAL:

Fear Surrounding the Great Unknown

Nobody knows how many Americans commit suicide each year. Official statistics run about 25,000. Because the subject of suicide raises taboos, many more go unreported. Some estimate that for every suicide reported annually three others go unreported, and for every reported and completed suicide there are 19 other incomplete ones.

Even the major hospitals lack meaningful statistics. Until 1965 the MGH made no systematic effort to get accurate figures on attempted suicides admitted to the hospital. The 1965 effort produced 250 cases. Not until the start of Project Omega (story on page 1), however, was it realized that even this effort was not enough. Another 40 percent of the attempts were slipping through the screen of the procedure.

Now the MGH has gone even beyond Project Omega. The hospital's General Executive Committee has authorized a Suicide Review Committee to determine how extensive the problem is. Dr. Avery Weisman, Principal Investigator of Project Omega, is chairman of the committee with the help of Dr. Leon Eisenberg, Chief Psychiatrist. To give the committee a broad base, the General Executive Committee also appointed Miss Mary E. Macdonald, RN, Director of Nursing; Miss Eleanor Clark, Director of Social Work; and Dr. Thomas S. Durant, Assistant Director of the MGH.

Once the Suicide Review Committee determines the extent of the problems, it will recommend new procedures to care for suicide patients. This effort is imperative. Besides the obviously terrible toll in human life, suicide presents a serious problem even when death does not ensue. The patient and family suffer anguish; hospitals find suicidal patients tie up large numbers of personnel.

Project Omega has already gone a long way toward adopting new approaches to both the suicidal patient and the one dying of incurable illness. One of its big handicaps has been the great phobia which the subject of death arouses in both the layman and the physician. Such fears make it extremely difficult for the dying man to come to grips with the prospect. They make matters complicated for the relative or friend trying to console the patient. And the phobias – both the patient's and the physician's own – may even make the doctor's treatment less judicious than normal. Yet knowledge is the enemy of fear. By projecting light where there is darkness, Project Omega and the Suicide Review Committee are making inroads on the fear that surrounds the great unknown.

Letters to the Editor

The MGH News *policy is not to publish letters praising the publication or a particular article unless some substantive point is made that will in some way contribute to public knowledge. For this reason the* News *has not published large numbers of favorable letters received. Although negative, the following letter offers a substantive comment about a particular editorial and in addition raises an interesting question about the* News *itself:*

Dear Editor:

I suppose many of those on your circulation list like and approve of the *MGH News,* but there have to be some dissenters, and I am one such. Why?

Because it seems an unnecessary expense. With hospitalization costing more and more it's time the hospitals stepped up their economies. Printing, mailing, and staff salaries but serve to multiply costs.

And as for what is in the paper and particularly the latest editorial it seems quite obtuse to deplore what inflation does to research funds when it's hospitals themselves that have been almost the most prominent factor in fueling inflation.

I say MGH should slow down medical research and concentrate instead on the broad area of hospital cost control.

Nathaniel L. Harris
28 Channing Road
Dedham, Mass.

(Editor's Note: The question of whether a hospital should assume the expense of printing a publication such as the *MGH News* is a good one. Here is a brief list of some of the reasons we believe such a publication is not only warranted but also important:

1. Readers get information about advances in patient care, research and teaching.
2. Readers show copies of the *MGH News* to private physicians previously unaware of advances in treatment of certain conditions. As a result, patients have come from as far as Texas to take advantage of new care unavailable at other hospitals.
3. Research projects in danger or failing for lack of volunteers have gained new impetus from readers who have volunteered their help.
4. University professors, school principals and teachers have written that they use the *MGH News* as a teaching aid in the classroom.
5. Legislators find information in the *News* that enables them to vote more knowledgeably on hospital issues.

We believe that the second point by itself justifies the cost of publishing a small news magazine like the *MGH News.*

The *News* also reaches employees of the hospital, potentially contributing to their pride in the institution for which they work. If an increased sense of pride contributes even slightly to the stability of the hospital's 6,000 employees, it also helps the institution's economy.

The large turnover of employees costs American hospitals millions of dollars each year.

Prospective employees are given copies relating to departments they are being interviewed for. Reprints from the *News* are also used in fund raising.

Mr. Harris' suggestion that the MGH "slow down medical research and concentrate instead on the broad area of hospital cost control" is also an interesting one, but note the following letter to Dr. John H. Knowles, General Director.

Research itself is valuable because the benefits of research redound to the patient. Anesthesia, first publicly demonstrated at the MGH, has saved countless lives and converted operations from medieval torture devices to painless cures. The observations resulting in the operation for appendicitis, to cite just one other MGH contribution, have also saved many lives.

Many other research achievements save billions of dollars as well as lives.

In addition, research enables the MGH scientist to bring the excitement of his laboratory into the classroom at Harvard Medical School. He becomes a better teacher who trains better students to deliver better medical care. High-quality physicians attracted to the MGH are often lured by the promise of being able to divide their considerable talents among patient care, research, and teaching.)

Dear Dr. Knowles:

It is encouraging in these days of spiraling costs to notice, in the May *MGH News,* your proposals for cost reductions within the hospital and without. It would be a blessing. Thank God for your insight.

Mrs. Emily Alper
Springfield, Mass.

Dear Editor:

I was quite disappointed with your March editorial.

You have accepted a very dangerous principle: that the government should support scientific research. However, government is the sole possessor of one thing that is incompatible with research: force, the antithesis of reason.

Research cannot be free when the sole legal possessor of force says what sort of research is to be done; according to your editorial the federal government is doing that. It doesn't matter which particular type is being supported at the moment; the principle remains the same.

Research, in order to succeed, must gain its support from rational persuasion, and not on the whims of a bureaucrat or the fluctuating fortunes of pressure group activity. If you really support scientific research, free it from capricious support.

Miles Salmon
Brighton, Mass.

The Nature of the War Dictates Stress, But...

At the start of the Vietnam War, predictions abounded that psychiatric casualties would prove high. After all, the nature of the war dictates stress – jungle combat, ubiquitous enemy, never knowing where he was, or when the attack would come.

"Despite predictions, the most significant fact is that psychiatric casualties are surprisingly low," Dr. Peter Bourne told MGH Psychiatric Grand Rounds. "The incidence of psychiatric casualties in Vietnam is about the same as for those in service stateside. But perhaps this is only the appearance of low casualties, as no good studies have yet been done on men returning from Vietnam."

Many of the results of studies done during World War II did not hold true for the current war.

Character Disorders

For instance, Dr. Bourne, a psychiatrist at Emory University Medical School, said many who were institutionalized in Vietnam as psychiatric casualties were not in combat, but rather in support units. In Vietnam, only six percent of medical evacuations were for psychiatric problems as compared with 23 percent in World War II. In that war, 60 to 70 percent of the psychiatric admissions were for combat fatigue, as compared with 5 percent in Vietnam. Forty percent of those admitted in Vietnam were for character disorders, often with previous records of problems, so not causally related to the war situation.

Dr. Bourne attributes the differences in the two wars in part to the sophistication of military planners' efforts to decrease the number of psychiatric casualties.

Different Type of Fighting

For instance, there have been greater attempts to decrease privation, which was shown in World War II studies to increase the chance of becoming a psychiatric casualty. Men are given rest periods after intense combat, and hot meals in the field. Medical training is better now and medical evacuation quicker.

The type of fighting is also different than it was in the world war. Combat is highly local in Vietnam, and there is little bombardment in one location. During World War II it was shown that men were most susceptible to psychiatric illness when under bombardment, unable to move or shoot back.

"In Vietnam, very brief engagements are characteristic – a few hours or days at most, whereas in World War II, battles often lasted weeks or months."

One-Year Tour of Duty

The most effective factor in decreasing psychiatric casualties, Dr. Bourne feels, is the one-year tour of duty in the war. In World War II, the only ways to get out were to get killed or wounded, or for the war to end.

Dr. Bourne has recently authored a book *Men, Stress, and Vietnam* pub-

(Continued on Page 8)

DR. PETER BOURNE

Project Omega: Probing Fatal Illness and Suicide

(Continued from Page 1)

in-depth studies. Suicide represents only one portion of the broad program.

The first project member to see Joan was Mrs. Mary Vallier, RN, a specially trained Nurse Clinician. She learned that Joan, despite denials, had tried to commit suicide.

Mrs. Vallier discussed Joan with a psychiatrist member of the project, Dr. Frederick Guggenheim, who interviewed Joan and agreed she needed the team's resources. The group sprang into action. Joseph P. Lemon, social worker, interviewed members of Joan's family at home and at the hospital.

A psychologist, Lee Johnston, gave Joan a battery of psychological tests, devised by J. William Worden, Ph.D., Research Coordinator.

Dr. Guggenheim and another psychiatrist project member, Dr. Harry S. Olin, interviewed her in depth.

When the group had completed their study, they had a fairly complete picture of her problems.

A 32-year-old mother of six children, Joan considered herself a worthless, repulsive freak unworthy of love. She wrongly believed her husband unfaithful to her, so they fought incessantly. When cancer struck her, despairing hopelessness followed, and their relationship collapsed.

Project Omega members, with the regular hospital staff, created a therapeutic atmosphere in her hospital situation. Both Joan and her husband received intensive counseling that improved her acceptance of her own image as well as her fatal disease.

"The suicidal solution she had used," Dr. Weisman said, "was no longer necessary. Her cry for help had been heeded," and the most significant other person in her life, her husband, learned to be more supportive.

"Everyone is potentially suicidal," Dr. Weisman said.

Project Omega has shown that one decisive factor that drives a person to suicide is a change in an important relationship, such as Joan's with her husband.

"Everyone needs to feel there is someone who cares," Dr. Weisman said.

To date, Project Omega finds many similarities between the person who succumbs to fatal illness and the one who gives in to suicidal thoughts.

Besides alienation from a loved one, the similarities include despair, self-destructive trends, acute loss of self-esteem, repudiation of help resources and the acceptance of death as the only solution to life's problems.

These findings are similar to those of Dr. George L. Engel of the University of Rochester. (March *MGH News*). His studies focus on fatal illness rather than suicide. But they suggest psychological factors may play a greater role in precipitating the terminal phase of fatal illness than most people have realized.

Dr. Engel's theory is based on a collection of anecdotes about humans and animals. Project Omega attempts to explore the concept in a systematic, detailed way, analyzing all the factors.

"We have found," Dr. Weisman said, "that there comes a point in any terminal illness when a person comes to accept death as appropriate for himself and to yield to the terminal process.

"In some sense, this is what the suicidal person does. When that happens, there is the same kind of alienation from other people, of repudiation of help, of despair."

Dr. Weisman said it is possible that the same type of psychological hardships might lead different people to different solutions.

One might find a solution he can live with. Another person might give up struggling.

Dr. Weisman theorized that one person who gives up might prove psychologically vulnerable to suicide. Another might prove vulnerable to a fatal illness that achieves the same end.

In probing for information that is leading to trends and theories, Project Omega has had to struggle against entrenched attitudes on the part of physicians as well as the public.

"Not every professional," Dr. Weisman said, "works easily with a dying patient, but it can be learned."

Dr. Weisman has written for his colleagues:

"To acquire skill in making cogent and reliable observations demands that the investigator come to terms with his own attitude toward death, and toward the events which bring about death – suicide, old age and incurable illness.

". . . By becoming concerned with how people die, we are less likely to think of a preterminal patient as an alien organism perishing in isolation after having thoroughly confounded our therapeutic efforts."

And in a talk to his colleagues, Dr. Weisman asked:

"Why is it that patients who come into a hospital *threatening* suicide are more apt to get treatment than those who have attempted it and have not succeeded?"

Dr. Weisman deplores the psychological neglect of people dying of a fatal illness. "A 'better death' could be provided for these people," he said, "by eliminating the 'secondary suffering' produced by psychosocial factors."

Despair is one of the qualities that leads to suicide.

The attitude of both patient and physician toward death, he believes, compounds the problem:

"I can't believe that death and dying have to be pathological," he said. "We make them pathological with our phobias."

To cut through phobias, misinformation and lack of information, Project Omega has developed, or modified, a number of techniques.

Its major instrument is the psychological autopsy. Developed about 10 years ago at the Los Angeles Suicide Prevention Center, the study had as its primary purpose the understanding of the circumstances in which suicide victims died. The Death Investigation Team attempted to reconstruct the life of the victim through interviews with people who knew the deceased.

The team's field of investigation was the suicide cases that were coming to the Los Angeles Coroner's office.

About six years ago Dr. Weisman and Dr. Robert Kastenbaum modified the psychological autopsy to study the last phases of life in some 75 aged patients. Their experience helped Dr. Weisman to tie in some work he had been doing with Dr. Thomas P. Hackett and apply the psychological autopsy technique to Project Omega.

What has evolved is the procedure described in the probing of events leading to Joan's attempted suicide.

The psychological autopsy thus complements the conventional one. While the normal autopsy seeks the cause of death, the psychological one studies the social context in which suicidal attempts or terminal illnesses occur.

The primary sources are inpatients from the Therapeutic Community, many of whom are suicidal (March *MGH News*). Before a patient becomes a participant, he must give his consent.

Project Omega has developed another technique to deal solely with the suicide segment of its study.

"It's long been known," Dr. Weisman said, "that you can't tell the seriousness of a suicide attempt just by looking at what the patient did." With about 500 cases, Dr. Worden and Robert Sterling-Smith, Research Analyst, evaluated and measured the risk and the rescue. They have set up a scale which numerically describes the seriousness of the attempt.

"Taking pills, or cutting a wrist, for example," Dr. Weisman said, "is not as serious as jumping from a height, or using a gun."

Performing a "psychological autopsy" are Dr. Avery Weisman, standing, and from left, around the table: R. S. Sterling-Smith; Cathryn Towne, RN, from White 12, sitting in for this case; Dr. F. G. Guggenheim; Dr. J. W. Worden; Dr. Harry Olin; Mrs. Mary Vallier, RN; Miss Lillian Cain, a social worker for this case; J. P. Lemon; and Lee Johnston.

The location of the attempt is also rated to determine whether the person had signified his hope and wish to be rescued. The person initiating the rescue is also rated.

"Was it someone known to the victim?" Dr. Weisman asked. "Was it a professional person? Was it a passerby? Then we have the probability of discovery by any rescuer, the accessibility to rescue, whether the patient asked for help, whether he dropped a clue, etc.

"Finally, the delay in time until the patient was discovered, because the 'rescuability' is modified if the rescue occurs within an hour, less than four hours or greater than four hours."

Other factors evaluated are the degree of consciousness after the suicide attempt, the nature of the wounds, the symptoms, the reversibility and the treatment required.

To help the suicide or terminal patient, Project Omega has developed the "participatory interview." Instead of playing the usual role of information gatherer, the psychiatrist participates with the patient.

"There is an exchange of feelings and thoughts," Dr. Weisman said, "a contact. If the crisis has been precipitated by the loss of a 'significant key other person,' by alienation or despair, we try to reverse that.

"Diagnostically the psychological tests have been extremely illuminating. Dr. Worden has been able to develop a battery of psychological tests that help us bring out significant conflicts much more clearly than do the psychiatric interviews."

Direct Question May Prevent Suicide

Dr. Avery Weisman suggests approaches that both laymen and professionals can use to help prevent suicides.

"Many people, including physicians," he said, "hesitate to ask a person about suicidal intent lest they push him over the brink. If anything, it pulls him back. So ask him about it first of all.

"Then make yourself available and accessible to him, not to moralize, not to increase guilt, but to be willing to provide help even in the face of rebuff. The suicidal person needs whatever can help maintain some measure of self-esteem and hope. After making yourself available and actively sympathetic to him, you should then try to push him toward professional help."

For professionals, Dr. Weisman offers the following advice:

"The biggest defect is lack of persistent follow-up after hospital care. It doesn't have to be a psychiatrist. It could be anyone significant to the suicidal person who will become a key other social being."

Dr. Weisman warns against regarding some attempted suicides as minor gestures:

"I consider any suicide attempt serious."

And finally, Dr. Weisman agrees with the more recent findings that persons who talk about committing suicide should be taken seriously:

"Directly or indirectly, most victims of suicide disclose their lethal intent to someone within a few months preceding the final act."

Infant's Diet – In Need of a Major Overhaul?

(Continued from Page 1)

Those in the large group had to struggle with one another to get milk from the mother. Since she has only a limited amount to give, the diet of this group is restricted.

By contrast, the two or three little ones with the other mother live in what Dr. Crawford calls the lap of luxury. At weaning (21 days) they are a little bigger than the large group.

After weaning, Dr. Kennedy would place all the pups in separate cages. They got as much food as they wanted.

"From the armchair," Dr. Crawford said, "you might predict that the little ones that have had to scramble for a living up to this time would quickly get themselves up to the same weight as the others. But this doesn't happen.

"We say that the animals have been imprinted. The imprint is already there by 10 days of unequal litter size.

Bigger and Bigger

"The animals brought up in the lap of luxury go on getting bigger and bigger and at three or four months of age are maybe 200 grams heavier than the others. That's a lot of difference when you consider that the average weight of a rat is 300 to 350 grams."

Bigger bones and more muscle make up part of that difference – a small part. Basically the products of the artificially small litter grow up to be very fat rats. The others stay lean.

Dr. Crawford and others have duplicated these findings. In addition, Dr. Crawford has gone on to study the activity of the rats.

After weaning, he has placed individual rats in squirrel cages where they could run on exercise wheels. The animals raised in the lap of luxury reached their peak activity on the wheels sooner than the others.

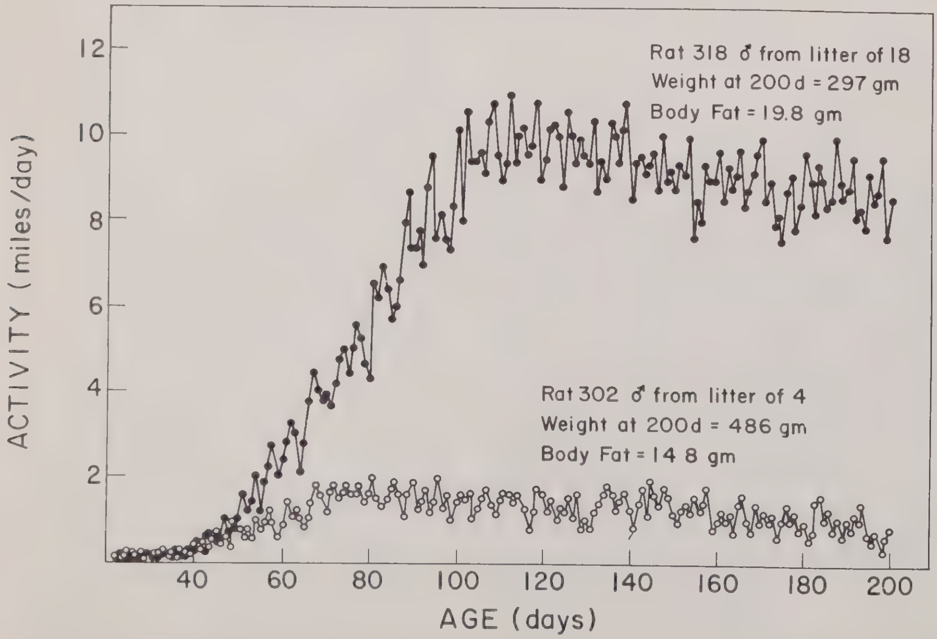
Little Fat

"Everything comes earlier in the lap of luxury animals," Dr. Crawford said. "Sex maturity comes sooner, peak running activity, peak body weight and death."

The Associate Professor of Pediatrics at Harvard Medical School pointed to a graph (pictured on this page). "Here you can see represented two rats that were sacrificed at 200 days. The rat brought up in a litter of 18 weighed 297 grams at the time of his death. His body fat was 19.8 grams or less than seven percent of his total body weight.

"The other rat came from a litter of four. His body fat of 148 grams is a significant percentage of his total weight of 486 grams."

The chart shows the larger rat from the smaller litter reached his peak of activity earlier but averaged only about two miles of running a day. The smaller animal from the larger litter eventually ran 10 miles a day.



Graph shows age in days on horizontal axis and the number of miles run by each rat per day on vertical axis. Solid circles on top show rat raised in large litter ran about 10 miles a day at age 100 days while fat rat raised in small litter averaged fewer than two miles each day.

Dr. Crawford has done experiments showing that rats reared in cages with activity wheels run about a dozen times as far each day as those first placed in such cages when adults.

"It is tempting to conclude from this type of experiment," Dr. Crawford said, "that for physical activity, as for eating, establishment of a pattern of relatively high indulgence in childhood may ensure a sustained high level in adult life."

Dr. Crawford has performed various types of activity studies in his laboratory at the Shriners Burns Institute next to the MGH. In one, he took young adult rats that had been raised in large litters. At the point at which one reached its peak running activity, he would close the door leading to the running wheel for about 10 days. Food intake remained pretty constant.

Ran Far Less

With the cessation of running, however, continuation of the prior food intake led to accelerated weight gain. When they were once more allowed to scamper on the wheel, they ran far less than previously.

"It has been possible in the young adult animals to damp the imprint for high levels of activity," Dr. Crawford said. "Such animals don't return as do older rats to their previous levels of running activity. Transiently, at least, these imprints are modifiable."

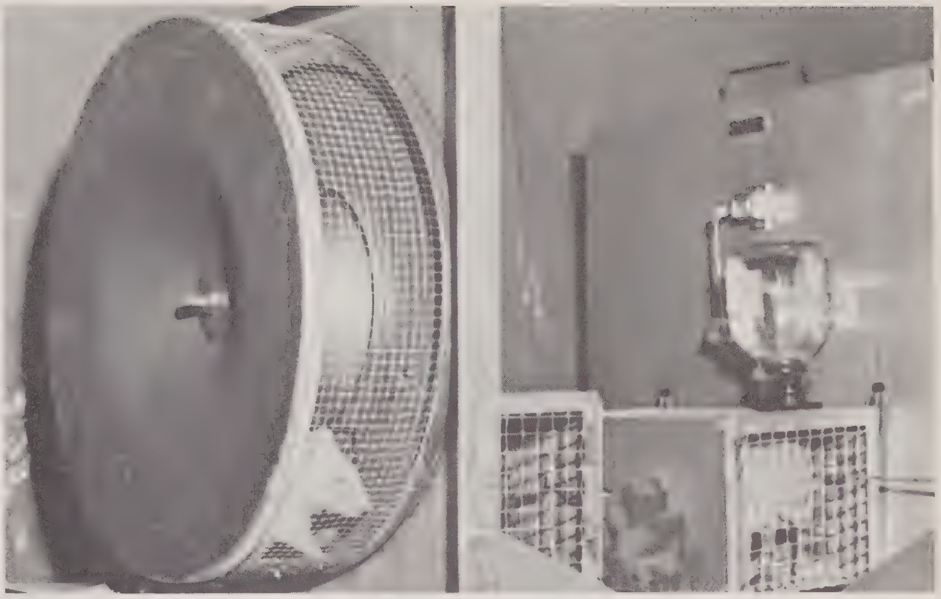
Dr. Crawford sees a parallel with the college athlete who gets a sedentary job once he leaves school. The inactivity often results in a weight gain which in turn tends to limit his activity further.

Another parallel between weight and activity in humans suggests itself.

Grew Lazy

"In the underprivileged countries," Dr. Crawford said, "the average person is smaller, later in reaching sexual maturity and physically apt to be a good deal more active than the average person in privileged countries."

Both activity and appetite are to a large extent controlled in a portion of the brain called the hypothalamus. Dr. Crawford's group destroyed the central part of the hypothalamus of rats and found they suddenly became lazy, but ate more and rapidly became obese.



Rat on left is in exercise wheel which records the number of miles he runs each day.

A 10-year-old boy in whom a tumor apparently damaged the same critical area of the hypothalamus gained more than 150 pounds in the next four years. When allowed free access to food, he never felt sated. His activity level dropped off considerably.

Longer Life Hinted

Another area that has interested Dr. Crawford is longevity. Several longevity studies have been done on rats raised in large vs. small litters. These are still statistically inconclusive. Since a rat ordinarily lives two to three years, long-term research with large numbers of animals is needed. Several studies, however, hint at conclusions.

"The few data I have," Dr. Crawford said, "suggest to me that longevity is greater in the animals that stay lean." A different kind of experiment hints in a similar direction.

Dr. Leonard Hayflick of the Wistar Institute in Philadelphia was the first to show that human cells cultured in a test tube have a limit to the number of times they can continue life by dividing or doubling. After reaching this limit the culture either dies or turns into tumors.

Hastens Death

Anything that hastens the division or doubling of human cells in the test tube – such as "feeding" the culture more nutrient – therefore hastens its death.

"I wonder," Dr. Crawford said, "whether the obsolescence that seems to be built in, as we grow our children bigger faster, may not relate to that phenomenon. I don't know."

In animals, other areas seem capable of imprinting besides obesity, and perhaps activity and longevity.

One is sex. If a female rat is injected with a tiny dose of the male sex hormone, testosterone, during the first days of life, long afterwards as an adult, she will display male sex behavior if caged with a normal female.

Loss of Sight

Another area of imprinting involves sight. If one eye of a kitten is kept patched during its early days, the visual cortex part of its brain will fail to receive the necessary stimulation. The result is the mature cat will never be able to see from that eye.

Another example involves humans. An infant deprived by disease of natural thyroid hormone in the period before birth, or soon after birth, can never benefit from artificial doses once the critical period of brain development has passed.

Still another example of imprinting occurred in an experiment conducted by Dr. Louis Dahl and his co-workers at the Brookhaven National Laboratories on Long Island. They exposed rats prone to hypertension (high blood pressure) to a high salt diet early in life. This relatively brief exposure to a large amount of salt was followed by severe hypertension long after they were freed from their high salt diet.

High Salt Content

Both Dr. Dahl and Dr. Helen Guthrie at Penn State's College of Human Development wonder whether the high salt content of processed solid foods fed American infants can cause later hypertension.

Dr. Crawford cautioned that experiments done with rats may not apply to humans. Nevertheless the parallels between results of various animal experiments and observations of humans lead him to sum up his thoughts in somewhat strong language:

"Pediatricians should think more about the kind of imprint they are building into children under their care. Like automobile builders, once the car is done, they tend to turn their backs on it.

"For a long time they have been sensitive to the need for proper mothering to set the appropriate psychological imprint. Now it is becoming evident that they must also pay attention to what Rene Dubos calls 'biological Freudianism.' One great advantage of being a pediatrician in a hospital such as the MGH is that we are afforded an opportunity to see how our former patients are functioning as they reach 20, 30 or 40 years of age.

"If the concept of imprinting is valid, then what we do in terms of providing diet, recommending right amounts of exercise or sleep – all of these things are potentially capable of altering the mature human."

The Sluggish Reptile

Dr. John D. Crawford cautioned that while environment (page 1 story) plays an important role in longevity, inheritance also plays a vital part.

He listed average life spans of various animal species in captivity to show how inheritance stamps itself on each type of animal.

For the mouse the lifetime is 18 months; the rat, 2-3 years; squirrels, 10 years; hippopotamuses, 40 years; and elephants, 60 years.

"These data suggest that life expectancy varies directly with body size," he said. In addition, Dr. Crawford noted that the rate at which various species use up energy also plays a part:

"The sluggish reptiles are well known for their prodigious survival ability, with the common box turtle on record as achieving the age of 123 years. Perhaps these animals use up the replicative potential of their cells much more slowly."

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The Nature of the War Dictates Stress, But…

(Continued from Page 3)

lished by Little, Brown & Company. He had conducted biochemical studies of stress on men in basic training at Fort Dix, and when he found himself in Vietnam, he continued his studies there, choosing as subjects those who did not become psychiatric casualties, but who had learned to adapt.

He pointed out that Vietnam provided the first opportunity to do such studies. Similar ones were attempted during the Korean War but were hampered by logistics and lack of appropriate methods.

Helicopter Crewmen Studied

Dr. Bourne studied two different groups for steroid levels in urine over a period of time. (Stress causes high levels of this substance to appear.) The first was a group of ambulance-helicopter crewmen, not including the pilots. These men lived in a villa in Saigon, went to the airfield every day, waited for a call, then flew out to pick up casualties on the field, often under heavy fire. Thus, they experienced periods of acute stress, then relative security.

After analyzing 24-hour urine samples for steroid levels for a three-week period, Dr. Bourne found no significant differences for days when the men flew from those they didn't fly, and very little deviation from the mean level for each individual.

Dr. Bourne explained that these men who had been in combat for more than three or four months were well adapted, each in his own way. They didn't really consider themselves in danger and thought of theirs as an 8-to-5 job.

The nature of the war dictates stress — jungle combat, ubiquitous enemy, never knowing where he was, or when the attack would come. (Wide World Photos)

The other group studied by Dr. Bourne was a 12-man Green Beret unit based 200 miles north of Saigon on North Vietnamese infiltration routes. These men recruited and trained locals as paramilitary personnel. They worked from a strategically located camp which was frequently attacked, placing them in constant danger.

Analyzing the steroid levels for this group, Dr. Bourne found that the levels for the officers were significantly higher than those for the enlisted men. The officer was under stress additional to the constant danger the whole unit shared.

"The enlisted men [who had been thoroughly screened to qualify as Green Berets] dealt with danger routinely," Dr. Bourne said. "The officer, in addition to the threat of the enemy, had to deal with harassment from his superiors via the radio, and the responsibility he felt for his men."

Officer's Interpersonal Tensions

The enlisted men tended to be older and more experienced, while the officers were usually young, recently out of West Point. They were the nominal leaders but had to prove themselves before they were accepted by the men. They took inordinate risks, which helps explain the high mortality rate for officers. Dr. Bourne observed that a death spiral developed between the officer and the senior enlisted men, each trying to outdo the other. Interpersonal tensions thus added to the officer's other stresses.

The enlisted men's steroid levels went down when they knew that the ever-threatened attack was finally coming. On the other hand, the officer's level went up, as did that of the radio operator. The latter was constantly with the officer and in on the decision-making.

Attack was the real test for the captain, and he could not help relieve this tension by laying mines and barbed wire as did the enlisted men.

MGH
News

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National Center Urged to End Wasted "Shots"

A national center storing immunization data about every American is urged by an expert on immunization.

"A center would be very expensive," said Dr. Thomas C. Peebles, Assistant Chief of the MGH's Children's Service. "But," he added in an *MGH News* interview, "in terms of relative cost effectiveness in the health care delivery system, I think that we could justify this expense, and in terms of preventive medicine we would be way ahead.

"Patients – whether children or adults – often have only the foggiest idea of what immunizations they've had. And a good percentage of the time the information they do give you is incorrect.

"They say, 'Sure I had a diphtheria shot,' when really what they had was a tetanus immunization. And they frequently confuse typhoid with tetanus. Immunization procedures have increased both in number and complexity, and it is impossible for most patients to keep track of them."

If a patient has been seeing one physician for many years, that physician's good records should compensate for the patient's poor memory. However, in most communities, hospital emergency wards increasingly substitute for the family doctor.

"In most hospitals," Dr. Peebles said, "emergency wards provide excellent care, but it is fractionated. They usually have no background history to go on and depend on the patient's poor medical memory to find out what inoculations he has had."

Thus, someone stepping on a rusty nail often receives a precautionary shot to prevent tetanus when he is already protected.

(Continued on Page 6)

Do Body Chemicals Cause Human Moods?

(Seventh of a Series on Basic Research)

Does man's mood depend purely on events that affect him?

Do chemical characteristics of his body result in one man's elation and another's depression?

Or do physical factors – such as a narrow or wide opening along a brain delivery route for a key chemical – cause these characteristic moods?

As yet, science does not know the answers. Despite ardent advocates for each theory, there is a good chance that chemical and physical factors play a role along with psychological and social ones.

Scientists around the world are wrestling with these theories. One of the promising groups is headed by Dr. Seymour S. Kety of the MGH.

"The debate between those who think that mental disease can be explained entirely by studying the brain and those who think that mental disease has very little to do with the brain is fruitless," he said. "The truth of the matter obviously is that human behavior is a combination of both the biological machinery and the information which is stored there – an interaction of both.

"The important thing is to find out what the biological factors are and what are the experiential ones which operate in any mental disorder and how they interact to produce the disorder. If we knew a little more about what the underlying mechanisms are, we would be in a position to find what can be done to treat and prevent it."

Dr. Kety's own training has stressed the physiological side. He nurtures the conviction that "the machinery of the brain must be important to human behavior, and that there must be disorders in which the machinery must be at fault."

With this background, Dr. Kety's work has gravitated largely to physiological and biochemical studies.

Until three years ago, he was Chief of the Laboratory of Clinical Science at the National Institute of Mental Health in Bethesda, Md. Since then, the psychobiologist has directed a group of MGH scientists pursuing the same problems.

They are seeking answers through the most basic kind of research – largely by examining the nerve cells of rat brains. Dr. Kety states his purpose modestly:

(Continued on Page 4)

Miss Rennie Nold, RN, Nurse Clinician, finds Andrew Blake an unsuspecting patient as she prepares inoculation with boy's mother, Mrs. Sally Blake, providing an assist.

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EDITORIAL:

Data Center: A Rocky But Passable Road

In a front-page *MGH News* interview, Dr. Thomas C. Peebles places a high priority on a national center for storing immunization data about every American. Before such a center could become practical, its founders would have to remove several barriers. One is the need to add yet another numerical system to our computerized society. Everyone in the country would require his own number so that the computer could call out his immunization record. This numbering system might be established by adding to an existing system: by giving everyone a Social Security number at birth instead of at the time of initial employment, for example. Funding the operation would be expensive. Yet, the potential in eliminating unneeded tetanus inoculations would in Dr. Peebles' view provide seed money to start a center.

Perhaps the most serious obstacle is the attitude of many physicians toward reporting data. For years states have required that physicians report certain communicable diseases. Doctors tend to report more serious illnesses while often ignoring ones they consider less threatening. Thus statistics gathered by departments of public health vary in reliability. Data from a national immunization center obviously would be no more reliable than the information fed into it. Would physicians prove any more efficient at reporting to a national center than to individual states? Probably not, unless some incentive or compulsion were built into the system. Dr. Peebles suggests that third-party payers such as Blue Cross-Blue Shield might require inoculation reports to be sent out before the patient is reimbursed. Consumer pressure on the physician as well as significant aid from the center in management of patients could also promote adequate reporting by physicians. And in a state such as Massachusetts, which supplies free vaccine to physicians, the doctor wishing to renew a supply might have to report the distribution of the previous lot.

Despite these and other drawbacks, an expert in the medical use of computers has told the *News* that the concept of a computerized national center is feasible. The *News* suggests a cost-effectiveness study of the idea as a possible first step toward establishment of an often-proposed national center to computerize entire medical histories of all Americans.

In the same interview Dr. Peebles outlined his views on a wide range of inoculation programs. The *News* agrees that this nation sometimes too ardently promotes a program of new vaccines. Where the disease to be prevented is itself dangerous – such as polio – the calculated risk is worth taking. New vaccines designed for mild ills, however, should always receive thorough study before licensure for mass use. In many cases this dictum is followed. There should be no exceptions.

Letters to the Editor

Dear Editor:

The April issue of the *MGH News* contains a very interesting article about a heart operation on a 14-year-old boy, who according to medical history should have been dead a dozen years earlier. Fortunately he survived a lot longer than expected, by which time medical science had found a way to cope with his ailment.

The May issue contains another interesting article about diagnosing diseases before the birth of a child, which is also wonderful progress. However, the treatment advocated in case the disease were present – the murder of the unborn child – is not, in my opinion, progress at all!

I'm a long way from being a scientist or a medical man, but I do feel the task of science and medicine is to find some way to cure the disease rather than taking a human life. The case of Winfield Williams demonstrates that all cases do not go as anticipated. Is it not possible that had Martha's third child been a male he would not have gone as the first two?

No doubt there is mental anguish when a defective child is born. Is there no anguish when a child's life is taken to prevent its being born?

I might have reasons for taking the life of someone I do not want around, but if I do so the law will hold me accountable. Why should not the same apply in the case of a helpless unborn infant whose life is taken?

Louis A. Welch, Springfield, Mass.

(*Editor's Note:* Certainly abortion is a controversial procedure. There are many persons who, like yourself, have strong religious or moral feelings about abortion done for any reason.

This is why abortion must always be left to the individual conscience of the mother no matter how liberal the law itself might be. No mother should be forced to have an abortion, and no physician should be forced to perform one.)

Dear Editor:

Project Omega [June-August *News*] sounds like an interesting, valuable study.

I am curious, however, about the choice of the picture entitled "Despair is one of the qualities that leads to suicide."

The dark hooded figure, the wet pavement, the deserted square indeed suggest loneliness. As I am a surgeon, and not a psychiatrist, I believe it was inadvertance, rather than some deep Freudian implication, that caused the selection of a man in a raincoat in front of St. Peter's in Rome as a symbol of despair.

Richard W. Dwight, M.D.
Chestnut Hill, Mass.

(*Editor's Note:* The photograph, we feel, is apt not only for its somber, lonely mood, but also because the hooded figure has his back to the basilica, thus symbolizing the turning of one's back on religion which sometimes characterizes the man contemplating suicide. No Freudian overtones intended.)

Horse and Buggy Doc a Model for Future?

With the perspective of a man who can look back on experiences as a surgical house pupil in 1905, Dr. Nathaniel W. Faxon looks ahead at medicine to see a coming reemergence of the general practitioner – with variations.

Dr. Faxon, Director Emeritus of the MGH, celebrated his 90th birthday last month. As General Director from 1935 to 1949, he led the hospital through the difficult war years, the Cocoanut Grove disaster, and the construction of two major MGH buildings. He was also one of the founders of Blue Cross.

He believes there is a trend back to a type of general practitioner, the likes of which have not been seen since the horse and buggy era. This development is linked to a growing emphasis on understanding social and economic medicine, as well as healing.

Family Doctor

"The old family doctor practiced social and economic medicine," Dr. Faxon said, "but there has been a period of 60 to 70 years when it has been neglected. During this period, the attention was focused on inpatient treatment."

But Dr. Faxon feels that now the medical profession and the medical schools are paying more attention to social and economic aspects of medicine, realizing that conditions at home affect health. Changing medical school curricula reflect this new awareness.

Dr. Faxon sees a merging of the roles of the old-time general practitioner and the modern internist to produce a type of physician slightly different from either, but combining the skills of both. This doctor would practice social and economic medicine as well as have the medical expertise of a modern internist.

"He should take the place of the 'old family doctor,'" Dr. Faxon said, "the one to whom all members of the family should turn in case of illness for treatment, advice and direction to the proper specialist when necessary."

MGH's Future

This trend, he feels, will also affect the future growth of the MGH. Although the institution will continue to grow, Dr. Faxon thinks it has reached its optimum number of inpatients. Increases should therefore be in the areas of ambulatory and ancillary services, care before and after hospitalization, and preventive medicine. He envisions a continued nationwide development of community health programs and centers like the MGH's at Bunker Hill and Logan Airport.

This trend does not mean, according to Dr. Faxon, that specialization will not continue. The ever-increasing complexity in medicine requires it.

Noting changes since he left the MGH in 1949, Dr. Faxon points to the sophisticated intensive care units, the developments in heart surgery, and the complicated medical equipment and devices as a few examples of complexity in medicine. And this partly accounts for the increasing cost of medical care.

Costs Won't Decrease

"I do not believe that costs will go down," Dr. Faxon said, "but possibly they can be stopped from increasing – by the development of nursing homes, of ancillary and ambulatory care, community health centers like the one in Charlestown, and the practice of preventive medicine."

Costs are just one thing that have grown substantially since Dr. Faxon's days at the MGH. In 1939, for instance, the maximum daily room rate was $16 in the Phillips House, and just $4 for the General Hospital.

The appearance of the hospital also changed radically during Dr. Faxon's directorship. The White Building (1939), the Chapel (1940), and the Vincent-Burnham (1947), with floors for women and children, were built.

The growth of the hospital over the last 70 years is also reflected in the number of patient beds: 329 when Dr. Faxon was a house pupil in 1905, 852 in 1940, and now 1,090. The number of house officers serving these patients has exploded from 20, when Dr. Faxon served on the short-lived South Surgical Service, to 120 in 1950 and 305 this year.

Author of History

Dr. Faxon is an historian of the hospital, drawing both from his own experiences here and his extensive knowledge of the hospital's earlier years. His history of the MGH from 1935 to 1955 is the last in a series of continuous histories of the hospital.

In addition to chapters following the MGH's life chronologically, Dr. Faxon's history includes chapters focused on various important topics including research, a hospital function which bloomed during Dr. Faxon's administration.

"Research has always existed at the MGH," Dr. Faxon recently commented, "but up to 1900 it was on an individual basis and mostly clinical. The establishment of the Pathological Lab with Dr. J. Homer Wright and the coming of Dr. Edsall in 1914 marked the beginning in a small way of more extensive research by many more people, and along the lines of what was then called basic research. This distinction is no longer valid.

"With the coming of World War II, the Army and Navy began to ask the MGH staff to study burns, shock, and infection, among other things. The results were so good that more and

(Continued on Page 8)

DR. NATHANIEL W. FAXON

MAN'S MOOD–A QUESTION OF EVENTS OR B

(Continued from Page 1)

"The ultimate aim is that by understanding something about how various natural substances operate in the brain we can understand how some drugs are acting in depression. Perhaps we can thus acquire new information which will make it possible to develop better drugs for treatment later."

Improved treatment would be of great importance because mood disorders affect vast numbers of people.

"There is a whole group of what are called affective disorders," Dr. Kety said. "In general these include very largely depression, the rarer mania and also rather rarely the mood swings between depression and mania.

". . . Depending on how one defines depression, in that category alone one can include anywhere from 10 to 25 percent of all people in certain periods in their lives."

Physical Basis

The discovery of drugs capable of producing these emotional states has stimulated the recent interest in seeking a physical basis for mood disorders.

A number of drugs have been found to cause depression. Others cause an elevation of mood.

"These suggest," Dr. Kety said, "a biochemical link between what these drugs are doing in the brain and the mood itself."

Reserpine is an important example of such drugs. Physicians giving it to control high blood pressure discovered that some patients on reserpine for long periods developed very typical depressions independent of the events occurring in their lives.

Then scientists at the National Heart Institute found that an important effect of reserpine was to deplete the brain of important compounds called biogenic amines. These are made in the body from amino acids, the natural and dietary substances which are also used to make proteins.

Current Interest

Current interest focuses on three biogenic amines: norepinephrine, dopamine and serotonin. Norepinephrine and dopamine have a chemical structure known as catecholamine.

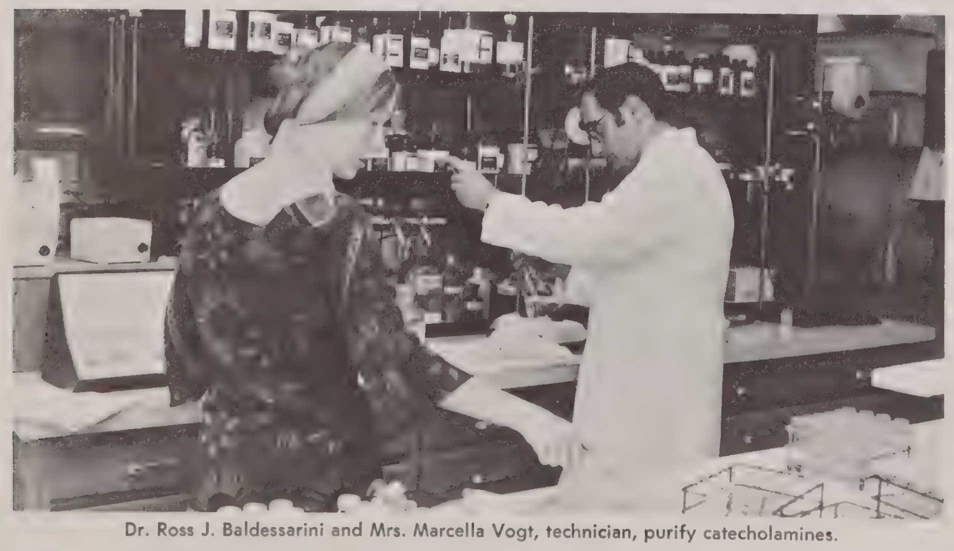
All three of these biogenic amines are found in the brain.

There are many indications that drugs which affect mood in man or the corresponding behavioral state in animals also have some important effect on these biogenic amines.

"Various hypotheses have developed," Dr. Kety said, "which attempt to relate one or another of the amines to mood and to disorders of mood. At the present time there is considerable evidence that the catecholamines – norepinephrine and dopamine – play some important but unclear role in mood.

Mood Drugs

"Drugs that alter mood affect the catecholamines of the brain in such a way that the drugs that elevate mood seem to increase the activity of catecholamines in the brain and the drugs that depress mood decrease their activity."



Dr. Ross J. Baldessarini and Mrs. Marcella Vogt, technician, purify catecholamines.

An extremely cautious scientist, Dr. Kety warns that to date research findings do not prove that the catecholamines play a key role in mood, "but the experiments are very interesting and are borne out with few exceptions."

Electroshock

Many of the studies had their origin, a number of years ago, in the classic work of Dr. Walter B. Cannon of Harvard Medical School and the MGH, who showed the role of peripheral catecholamines in emotional states. In a seemingly unrelated direction, researchers have long wondered why electric shock remains the best treatment available for certain forms of depression. No one quite understood why electric shock worked at all.

For a number of reasons, Dr. Kety and his colleagues at the College de France where he was Visiting Professor in 1967 developed the hypothesis that electroshock did something to the catecholamines in the brain.

Tested Hypothesis

They conjectured that each shock causes a release of catecholamines and that this release stimulates the biological machinery for their further production. Thus, after a long period of shock treatments, the patient might develop an increase in the enzymatic machinery which produces catecholamines in the brain.

Just before his coming to the MGH, the Kety group tested that hypothesis in normal rats which were given electroshock treatments.

The rats were examined 24 hours after the last of a twice-a-day course of electroshock treatments which lasted a week. By then those rats had returned to their pretreatment state and were indistinguishable in behavior from others who had received no treatment.

Increase in Rate

Nevertheless, the treated rats showed a 30 to 50 percent increase in the rate at which they made norepinephrine in the brain.

"It appeared to support the hypothesis that we started with," Dr. Kety said. "And it would be compatible with the idea that in depression there is somehow an insufficiency of norepinephrine and that electroshock was

Y CHEMICALS?

helping this by restoring the machinery for producing it. But that relationship is by no means proven, and I am sure substances other than norepinephrine are also involved."

A number of experiments by other scientists have shown norepinephrine to be important in the nerve circuits that underlie arousal and emotional states in animals and perhaps in the disorders of mood in man.

Other Studies

Scientists had shown that animals, enabled to stimulate electrodes placed in certain deep parts of their own brains by pressing a lever, would give up food and sex to press this lever. It seems reasonable that the portion of the brain stimulated produced something akin to pleasure in these animals.

Other studies have shown that drugs which increase norepinephrine concentration in the brain will make an animal press the lever even more. By contrast, the drugs which block or lower the norepinephrine in the brain will stop this activity.

In another experiment, Neal Miller at Rockefeller University found that by injecting tiny amounts of norepinephrine into a certain area of the brain's hypothalamus, he could get an animal which had been satiated to start eating again. Drugs which block norepinephrine action also block this effect, and drugs which enhance norepinephrine action will enhance it.

Major Obstacles

"Our research here [at the MGH]," Dr. Kety said, "has to do with some fairly basic examinations of biogenic amines in the brain." The research group is studying how norepinephrine is made, its rate of utilization, the various mechanisms which regulate its synthesis, how it is stored, how it is released, and the action of various drugs upon it.

Thus far, clinical studies occupy only a small portion of the group's work. Major obstacles have prevented the measurement of catecholamine use in the human brain.

"In rats," Dr. Kety said with a smile, "the process is simple. We can analyze their brains directly." In man we must devise indirect techniques to get at this information.

Steven W. Matthysse, Ph.D., adjusts the program of an instrument (a gas chromatograph) used to measure catecholamine derivatives in rat brain tissue.

Attempts to use blood or urine for study encounter complex problems.

"We have to figure some means of measuring catecholamines in the human brain without doing anything detrimental to the patient."

A Clue

Dr. Kety's group has a clue: The metabolism of catecholamines in the brain is somewhat different from that in the rest of the body.

Some sophisticated mathematical formulas might provide an answer. One of Dr. Kety's group, Steven W. Matthysse, Ph.D., is searching for an indirect way of measuring catecholamine manufacture in the brain. One hope, for example, is to measure the very small amounts that appear in spinal fluid in the belief that this fluid may reflect what is happening in the brain.

Release of Norepinephrine

Dr. Ross J. Baldessarini and Dr. Manfred Karobath are separating various components of homogenized rat brain tissue by methods called ultrafiltration and ultracentrifugation. One component obtained is made up of synaptosomes or "pinched-off nerve endings." These include the synapses, or places where two nerve cells come together to transmit impulses.

The synaptosomes taken from the brain contain norepinephrine and other biogenic amines. Using these synaptosomes, the scientists are trying to find out what is involved in the manufacture and storage of norepinephrine and in its release by nerves under more easily controlled laboratory situations.

Dr. Baldessarini has worked out a technique which allows him to examine the release of both norepinephrine and serotonin when isolated parts of the brain, placed in a test tube, are stimulated electrically or chemically. In that way something may be learned about the physiological and chemical factors which control the release of norepinephrine at nerve endings and the ways this may be influenced by drugs and other forms of therapy.

A Long Time

". . . It is going to be a long time before we go from these basic studies to develop theories about psychotic illnesses," Dr. Kety said, "but we feel that it is very important to establish a base of knowledge in the conviction that the catecholamines and other amines of the brain are in the brain for an important function. That function, on the basis of present suggestive evidence, appears to be related to mood and emotional state.

"It seems that the increase in our knowledge of how these amines are made and released in the brain cannot help but contribute to our understanding of brain function, quite possibly to various aspects of behavior and hopefully to the disorders of mood."

Reevaluation Sought for Immunization Programs

(Continued from Page 1)

Judging from his studies, Dr. Peebles estimates that Massachusetts residents alone receive a half million unnecessary tetanus booster shots each year. This probably means more than $1 million is wasted annually in Massachusetts.

"Now, multiply this savings in 50 states," Dr. Peebles said. "A kitty of $20 to $60 million a year could be saved. That money might be diverted to the establishment of a computerized center for data storage and easy retrieval of immunization histories."

Saves Sore Arm

The emergency-ward doctor could then dial a national number and within minutes find out if and when the patient had received a given shot.

"He saves money, a sore arm and other possible side effects," Dr. Peebles said.

Dr. Peebles would like to see the federal and state governments and perhaps insurance companies provide seed money for a national center with regional offices. "It would save them money in the long run," he said.

A computerized national center for complete medical histories of all Americans has been proposed by a number of people in recent years.

Facilitate Studies

"We need this for all medical histories," Dr. Peebles agrees, "but an easy way of beginning would be to store up information on immunizations."

A national center could also facilitate setting up immunization reevaluation studies.

"Money for such studies is going to have to be appropriated," he said. "Immunization is a big part of our health care output now. Tremendous energy is going into it. A lot of money – mostly consumer money – is going into it."

Dr. Peebles questions whether many inoculation dollars could not be better spent. He has no argument with well-planned immunization programs:

Certain Risks

"Immunizations in general have done a whale of a lot in reducing the incidence of disease."

On the other hand, inoculation, especially in the early stage of a new vaccine, carries certain risks:

"You remember the first Salk vaccine which contained live polio virus, and then was found to have some SV-40 virus in it." Yet the complications, even in the early years of the Salk vaccine, were few compared with the thousands of cases of polio in an epidemic year.

"Now polio is so rare," Dr. Peebles said, "when you have a documented case, it is almost worth writing up.

"... There always may be other unknown factors related to any vaccine we try, latent, initially unrecognized problems which might only come to light 15 years later. But sometimes you have to take a calculated risk on theoretical grounds" (when you feel that statistically you will prevent far more disease than you cause).

Smallpox Reappraisal

Dr. Peebles believes the risks of vaccines should constantly be reevaluated. He agrees with physicians in Denver who urge a reappraisal of the wide use of smallpox vaccine in this country.

Several Americans die each year from vaccination complications, and such complications run in the hundreds. Yet the United States has seen no smallpox for years.

Mumps Vaccine Overused?

"To protect against a disease that we now don't have," Dr. Peebles asks, "is it wise to take these risks with a vaccine which causes such side effects?"

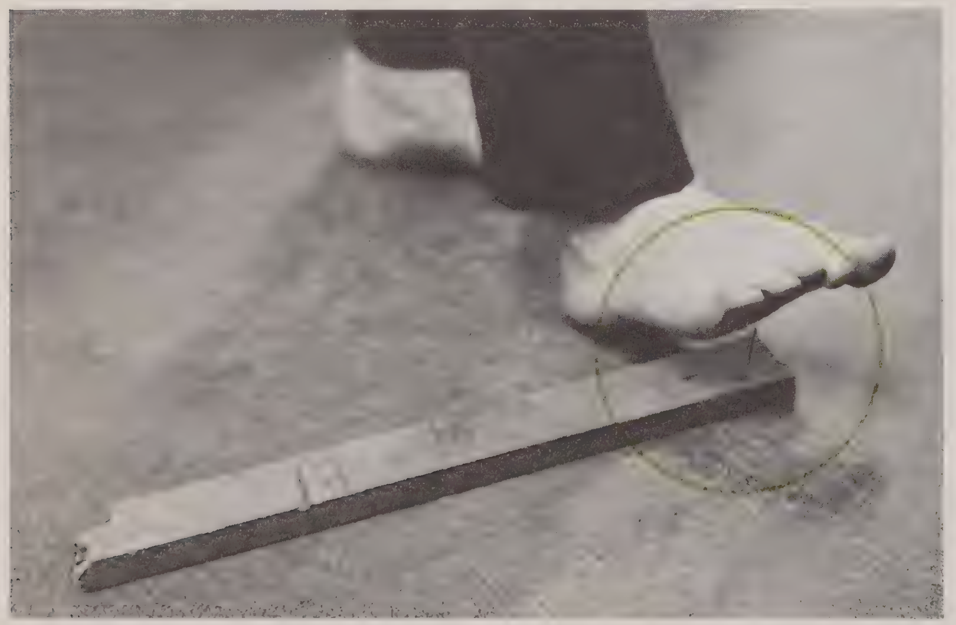
The Assistant Professor of Pediatrics at Harvard Medical School also believes that the mumps vaccine may be overused. He is chairman of the Committee on the Control of Infectious Diseases of the Massachusetts Chapter of the Academy of Pediatrics which took a stand some time ago on this question.

Fatal complications from mumps are rare. Dr. Peebles believes the sterility possibility for adult males is overrated and that deafness may be very uncommon although good data are lacking.

Long-Term Effects

"Our committee," he said, "came out with a statement suggesting discretionary options rather than requiring this vaccine for every youngster between age 1 and puberty in order to protect against a disease which has as little mortality and morbidity in this age group as mumps has.

"We don't know the 15- or 20-year effects from using live virus. Inoculating everyone costs a lot of money. Is it worth it in terms of cost effectiveness compared with application of that money and that effort to some other area of health care?"



Someone stepping on a rusty nail often receives a precautionary shot to prevent tetanus when he is already protected.

To protect against the risk of sterility, the committee suggested limiting the vaccine to preadolescent males and adult males who had not had the disease as well as in certain institutional situations to prevent epidemics. Massachusetts opted for inoculation of all schoolchildren.

Rubella Concern

The current concern of many specialists is the German measles (rubella) vaccine. German measles is a mild disease itself but can lead to a defective fetus when contracted by a pregnant woman.

The National Committee of the American Academy of Pediatrics recommends immunizing young schoolchildren to prevent them from passing the disease to their pregnant mothers. Recent articles in the *New England Journal of Medicine,* however, cast doubt on the long-term effectiveness of the vaccine.

"Why, therefore," Dr. Peebles said, "should we then go ahead and immunize a nation full of kids who aren't themselves at risk against this virus disease unless studies have shown the vaccine's effectiveness in preventing fetal abnormalities caused by rubella in the pregnant female?"

Mild Form

There is also good evidence that, while vaccinated people avoid the rash, they experience a mild form of the disease without realizing it.

In the July 30 *New England Journal of Medicine,* Nobel Prize Winner John F. Enders, Ph.D., of Harvard Medical School (Dr. Peebles worked with Dr. Enders in isolating the measles [rubeola] virus), editorially stated that doubts about the vaccine program "should not for the present be allowed to interfere with its continuation."

Dr. Enders suggests limited scale testing of high-risk pregnant women or of adolescent girls. Presumably inoculation at that time would stand a better chance of offering protection during childbearing. On the other hand some women might become pregnant within weeks, and science is uncertain whether mild disease from the vaccine itself might lead to fetal deformity. Dr. Peebles favors selectively inoculating those women of childbearing age who are shown by blood tests to be susceptible.

Lending urgency to their debate is the knowledge that the country is due for an epidemic year. Those favoring massive inoculation believe hoped-for reduction in deformities to unborn babies is worth the risk of using a vaccine about which much is unknown or questionable.

Those opposing widespread use without further testing believe there is a possibility the vaccine could boomerang. Eighty-five percent of all women of childbearing age possess natural immunity to German measles conferred on them by contact with the natural virus.

Tetanus Concern

Should fears, that the vaccine's protection is not long lasting, be justified, the vaccine might diminish the chance to develop natural immunity and leave the woman unprotected at the time of childbearing. The long-range result of inoculating school-age girls could prove harmful. Close to 100 percent of childbearing women could become unprotected instead of the 15 percent of prevaccine days.

Another area of great concern to Dr. Peebles is tetanus immunization. In 1969 he was the principal author of a *New England Journal of Medicine* report describing research done by the MGH's Children's Service, the Department of Pediatrics of Harvard Medical School, the State Laboratory Institute of the Massachusetts Department of Public Health, and the Department of Microbiology of the Harvard School of Public Health.

Almost Annually

This study suggested that protective immunity for tetanus lasts more than 10 years following immunization in infancy.

Prior to the report, physicians routinely gave booster shots to children injured more than a year after their last shot. Many accident-prone youngsters thus received almost annual shots.

Dr. Peebles concluded:

"Therefore, if a routine program of booster shots is administered by physicians about every 10 years, emergency boosters after injury are not usually necessary. But to save the unneeded expense, sore arms and other possible side effects demands accurate record keeping. A national center could surely provide this."

Vaccines – A Precarious Item

"Extreme care in storing vaccines is a constant necessity." Dr. Thomas C. Peebles checks vaccine in refrigerator.

"Extreme care in storing vaccines is a constant necessity," Dr. Thomas C. Peebles warns physicians.

He cautions that a new dimension has been added to the existing problem of the delicate vaccine:

"Formerly I used to buy my polio vaccines directly from the manufacturer. They were shipped to me in dry ice and went directly into my freezer. Then the state started buying vaccine and supplying it free to physicians.

"This was distributed from the state, to the local boards of health, to the physicians. So now there is a chain of many links: from the company to the state, from the state to the boards of health, from the boards of health to the physician. There are many places where this chain can be broken, including right in the physician's office.

"The vaccine, therefore, must be carefully and constantly refrigerated both during transportation and in the physician's office."

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A Charge Confirmed; A Plea for Change

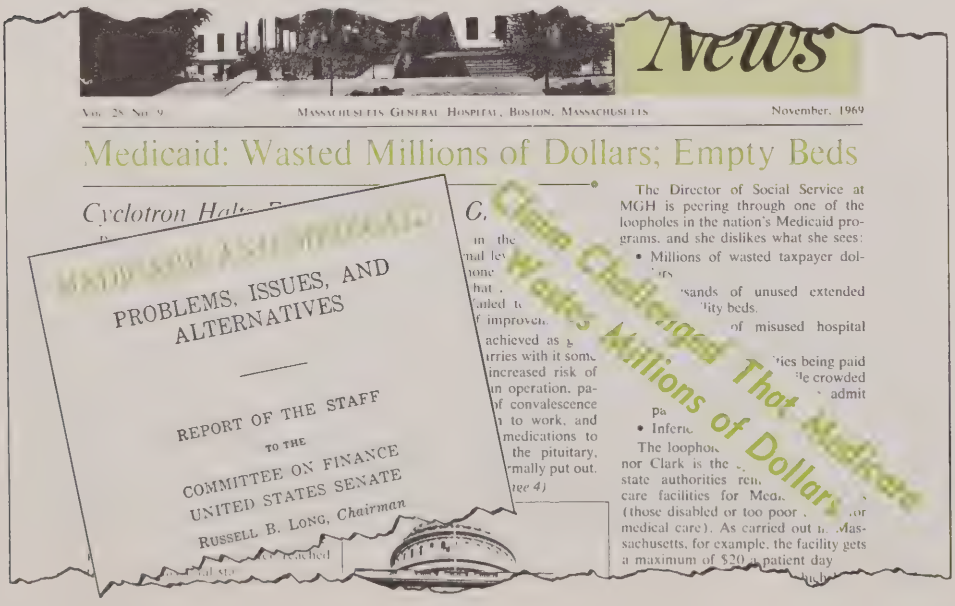
In its November, 1969 issue, the *MGH News* carried an article exposing the waste of millions of dollars in federal funds resulting nationally from an oversight in the Medicare-Medicaid programs.

Miss Eleanor Clark, Director of Social Service at the MGH, in an interview, said that unequal reimbursement formulas paid to extended care facilities under Medicare and Medicaid were at fault and that: ". . . the extended care facility does better to keep empty beds than to accept a Medicaid patient. The cost to the federal government of paying for all the empty beds is outrageous."

A Social Security Department official challenged the charge. Now the staff of the U. S. Senate's Committee on Finance has confirmed it and proposed changes. On page 52 of a Medicare and Medicaid report to the committee, the staff writes, "Under the present cost reimbursement regulations, it is possible for a hospital or extended care facility to be paid for the costs associated with all of its empty beds, as well as those beds occupied by Medicare patients. . . . The regulations, as now written, contain no provisions to avoid such situations. Medicare makes investment virtually risk-free where it bears full costs. Thus, institutions may be built more freely – even where new or expanded bed capacity is not needed.

"The staff recommends two changes in the reimbursement provisions to meet this problem: 1. Medicare should limit payment to the lesser of costs or the published charges which a non-governmental institution would make to a patient paying his own bill; 2. Medicare's share of costs associated with empty beds in the facility might be limited to the proportion of beds with Medicare patients to the total number of beds."

In her interview, Miss Clark had suggested two alternate changes, then added: "At any rate, one thing is sure. The government needs some formula for not rewarding empty beds."



News

Vol. 28 No. 9 MASSACHUSETTS GENERAL HOSPITAL, BOSTON, MASSACHUSETTS November, 1969

Medicaid: Wasted Millions of Dollars; Empty Beds

Cyclotron Halts

PROBLEMS, ISSUES, AND ALTERNATIVES

REPORT OF THE STAFF
TO THE
COMMITTEE ON FINANCE
UNITED STATES SENATE
RUSSELL B. LONG, *Chairman*

Clinic Challenges That Medicare Wastes Millions of Dollars

The Director of Social Service at MGH is peering through one of the loopholes in the nation's Medicaid programs, and she dislikes what she sees:

- Millions of wasted taxpayer dollars

HISTORIAN LOOKS AHEAD

(Continued from Page 3)

more problems were presented to hospitals and the scope of this research expanded."

There was opposition to hospitals conducting basic research, by people who thought the hospital's realm included only purely medical and clinical subjects. The MGH trustees and staff did not agree, however, and forged ahead.

"The result is the Research Building, the Warren Building, the Committee on Research, the Scientific Advisory Committee, and the status of research as an equally important hospital function along with patient care and teaching."

In 1935 the total spent on research was $50,000. In 1955 it was $2,000,000 and last year, $13,067,913.

Increase of Morale

"While the amount of money shows the growth, a really more important effect is the increase of morale of the staff and their intellectual activity," Dr. Faxon said. "This is what Dr. Walter Cannon of Harvard and the MGH called 'the fecundity of aggregation,' and President Lowell of Harvard, 'the stimulating effect of intellectual attrition.' Both statements are meant to call attention to the effect of many minds working on many problems, fertilizing each other, and producing unexpected results."

From his MGH graduation in 1906 until World War I, Dr. Faxon practiced medicine in Stoughton. After service in Field Hospital No. 28 during the war, he was appointed Assistant Director of the MGH in 1919. He left in 1922 to become Director of the Strong Memorial Hospital in Rochester, N.Y. The MGH drew him back in 1935 to become Director. The year after his retirement in 1949, he was named Director Emeritus.

MGH News

Vol. 29 No. 8 MASSACHUSETTS GENERAL HOSPITAL, BOSTON, MASSACHUSETTS October, 1970

Schizophrenia: The Search for a Biological Cause

(Eighth of a Series on Basic Research)

Schizophrenia accounts for more occupied hospital beds than any other illness and more than all the other mental illnesses combined.

That is because its onset is early, and even with tranquilizing drugs, many victims of this disease spend much of their lives hospitalized.

In its severe forms schizophrenia also prevents unhospitalized people – many of them young – from making a contribution to society and from fulfillment in their own lives.

Yet, despite its ravages, schizophrenia remains of unknown origin.

Dr. Seymour S. Kety of the MGH has long believed that it, like mood disorders (see September *MGH News*), results from an interaction of biological and psychosocial causes.

One way of approaching the question is to determine if heredity plays a part. Where inheritance does prove a factor, it is fairly certain that biochemistry must be operating at some level. Before plunging into time-consuming studies of the biology of the brain, Dr. Kety decided to examine the evidence for heredity in schizophrenia. One of the main arguments for inheritance had been that the disease runs in families.

"But that doesn't prove that it's genetic," Dr. Kety said, "because families share environmental interactions as well as genetic endowment."

While still at the National Institute of Mental Health, Dr. Kety devised a project with his NIH colleagues, Drs. David Rosenthal and Paul H. Wender.

They decided to study adopted chil-

(Continued on Page 6)

Toward More Efficient Outpatient Service

The drug addict with hepatitis, the woman with a persistent headache, the victim of venereal disease and the man with a severe cold – these are some of the patients likely to find their way to a new MGH clinic.

Called the Ambulatory Screening Clinic, it is designed to help loosen the crush of patients descending on the hospital's Emergency Ward.

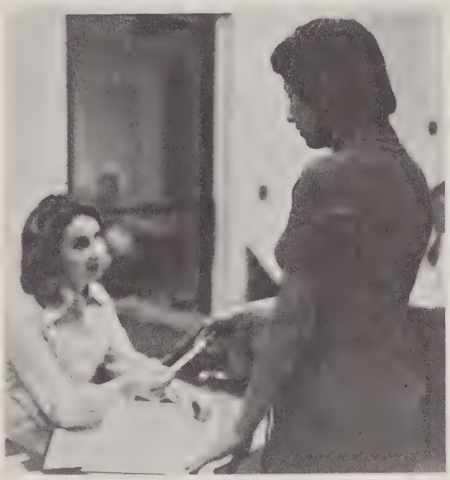
The program may also help determine whether such clinics can benefit large outpatient facilities.

As the general practitioner has become an increasingly scarce commodity on the national scene, the public has thronged to emergency wards and outpatient clinics for treatment. Many of the sicknesses are not emergencies, but the patient has often turned to the hospitals in despair of finding a general practitioner.

At the MGH, 70,000 patients sought Emergency Ward care in fiscal 1969, an increase of 27,000 in seven years.

To siphon off some of this burden, the hospital examined a screening system used by Kaiser-Permanente, a prepaid, group-practice medical program operating on the West Coast. The MGH has adapted and enlarged upon the system to fit it to the needs of the large urban hospital.

Dr. John D. Stoeckle, Chief of the Medical Clinic, and Dr. Jerome H. Grossman, Associate Chief, set up the Ambulatory Screening Clinic under the overall supervision of Miss Ruth M. Farrisey, RN, Executive Officer for the Clinics.



Miss Carolyn Johnson, Senior Secretary, registers Rose Marie D'Alessandro in Ambulatory Screening Clinic.

"It is not the purpose of the Emergency Ward," Dr. Grossman said, "to spend its time treating people with colds and sore throats. The Emergency Ward's task is to care for the injured and for the critically ill. The screening clinic, on the other hand, is designed to treat people who are not severely ill."

The Emergency Ward refers about 35 of its patients a day to the screening clinic. The remainder of the average daily screening clinic census of 60 comes by referral from the clinics admitting office or from other clinics.

The $16 standard clinics' fee helps discourage overuse for minor problems. Because of large numbers of poor patients who receive free care, however (and others who fail to pay their fees), the operation fails to be self-supporting.

One basic element of the new program stems from what the military call

(Continued on Page 4)

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EDITORIAL:

New Dimensions in Patient Care

By now, most Americans have heard cries for a radical overhaul in the system for delivering health care. One area of great concern is outpatient services. With emergency wards and clinics often becoming a surrogate family doctor, such ambulatory facilities are taxed beyond their means.

Hospitals cannot without limit enlarge their outpatient buildings. Nor can they endlessly add personnel to staff them. More efficient use of existing space and personnel is obviously a prime requisite.

The MGH is trying out a pilot project as one attempt at bettering efficiency. In a page 1 story the *News* describes the Ambulatory Screening Clinic. By evaluating each patient and deciding rationally where in the clinic system with its many specialties he fits, the screening clinic adds a new dimension. By providing the specialist with the patient's medical history and test results, the new clinic facilitates the specialist's examination.

As the article points out, screening solves only part of the problem of thronged outpatient waiting rooms. Moreover, the irony is that if such programs prove successful, their fruits may not in the long run remain within the physical confines of the urban teaching hospitals. A debate is raging across the country about whether the routine portion of care provided by outpatient departments belongs in large city hospitals. Many say yes. Many others argue that the routine care belongs in the community at a facility such as the MGH's Bunker Hill Health Center in Charlestown or in community hospitals. If screening is shifted to the communities, then the MGH Ambulatory Screening Clinic might be moved from the MGH itself to a center such as the one at Charlestown.

Similarly, screening clinics that might arise would spring up in thousands of satellite communities rather than in the big city hospitals.

* * *

Appropriate delivery of medical care is also the concern of the Coordinated Home Care program, described on page 3. Just as the screening clinic offers a more efficient alternative to Emergency Ward service for those who are not emergency cases, Coordinated Home Care offers an alternative to prolonged hospitalization. It benefits the patient by reducing his costs and increasing his morale. It benefits the delivery system by making possible earlier discharge, thus freeing hospital beds needed by patients more critically ill. All involved would benefit if staff members of hospitals made maximum use of the program's possibilities.

Letters to the Editor

Dear Editor:

In your June-August, 1970 *MGH News* I read on page 7 in "The Sluggish Reptile" that life expectancy favors animals that move little or slowly. How can I therefore evaluate the present propaganda for exercise and jogging?

Mrs. Arthur Gilbert
Brookline, Mass.

(*Editor's Note*: The following reply to Mrs. Gilbert's letter was written by Dr. John D. Crawford whose studies and observations were discussed in the article to which she refers.)

While it may be true that the longevity of the poikilothermic (having a body temperature that fluctuates with the temperature of the environment) reptiles is related to their low metabolic rates, man is homeothermic (maintaining uniform temperature despite variation in the surrounding temperature). As yet it is only a dream of the fiction writers that longevity sufficient to permit human beings to travel to planets lying outside our solar system can be achieved by prolonged reduction of the metabolic rate through cooling.

Granting that obesity reduces longevity, regular exercise such as jogging seems a very appropriate control measure. Mayer and Bullen (*Physiological Review* 40: 369, 1960) have shown convincingly that weight is maintained constant by appropriate adjustments of intake through a wide range of physical activity. When the latter falls to a critical point, however, appetite control breaks down and both food intake and weight climb. I am afraid that most of us nowadays live very close to this critical point. Regular exercise helps shift us into the zone where appetite is appropriately adjusted and consequently obesity is far less likely to occur or to persist.

The *MGH News* welcomes letters from its readers. To avoid condensation, letters should be brief and must be signed. Names will be withheld on request.

COORDINATED HOME CARE

To Cut Costs, Increase Morale, Free Beds

Mrs. F. was afraid of doctors, so although she had not felt well for three years, she refused to consult a physician. A friend finally convinced her to go to the MGH clinics. Her reluctance to seek care was unfortunate. She was quickly diagnosed as having an advanced stage of cancer. She underwent surgery at the MGH, but her disease was considered terminal.

She was referred to the Transfer Office, an arm of the Social Service Department, for placement for post-hospital care.

Social workers decided that hers was a case that could benefit from the specialized services of Coordinated Home Care, a program established between the MGH and the Visiting Nurse Association of Boston in July, 1969.

Periodic Meetings

Her four children, ranging from 10 to 18 years old, and her husband wanted her to come home. Coordinated Home Care helped the family to provide the backbone of Mrs. F.'s care. A V.N.A. nurse visited her daily, and a Home Health Aide helped with personal care for three hours a day. The family was supported through the tremendous emotional impact of the mother's terminal illness. A Family Service counselor worked with the children.

All those involved in Mrs. F.'s continuing care met periodically to discuss the family's changing situation. For instance, when Mr. F. suffered a stroke, the group advised and arranged for his transfer to an extended care facility following his hospitalization.

Many Services Provided

The Coordinated Home Care program can provide, in the patient's home, many of the services of the hospital. Available in addition to nursing and home health aide services are physical and occupational therapists, social workers, family service counselors, dietitians, if special diets are required, speech therapists, hospital equipment, inhalation therapy, laboratory services, and transportation to and from hospital clinics or a physician's office.

Most of the services are provided by the V.N.A. and other community organizations. The patient's physician and social worker from the hospital also follow the patient's continuing treatment.

A patient can be referred to the Coordinated Home Care program by his physician, any member of the professional staff, his family or a friend. Referrals go through the hospital's Transfer Office.

Adjustment to Home

Miss Laurel King, the V.N.A. Coordinator for the MGH, visits the patient on the hospital floor and with the professional staff caring for him, evaluates his needs for various services. The Coordinated Home Care group helps the patient and his family adjust to the home situation. Weekly conferences are held to discuss patients' continuing care.

The details of each patient's situation are discussed at least once a month, more frequently if necessary. The conference is attended by all those involved in the patient's case, plus a medical adviser appointed by the hospital as a consultant, and the V.N.A. coordinator who schedules and directs the conferences.

Home care presents various advantages for patients. It often means earlier discharge from the hospital, freeing needed beds while reducing charges. In addition, being in familiar, comfortable surroundings frequently boosts patient morale.

Mr. N., for example, needed care for a week between his hospitalization and readmittance for cardiac surgery. A nursing home was a possibility, but institutions frightened Mr. N. His fear was intensified by his one chance in a hundred of surviving surgery. His anxiety was contributing to his illness.

Coordinated Home Care arranged for him to go home. A nurse visited him daily, and oxygen therapy was provided. The family was supported in facing the approaching surgery. Mr. N. felt psychologically more comfortable at home, and the cost of his care for seven days totalled only $135, instead of a much greater hospital bill. He came through surgery successfully and recovered.

Coordinated Home Care is part of a national trend that recognizes the benefit of offering alternatives to extended hospitalization.

Feasible Services

"Coordinated Home Care provides an opportunity to give more care to more sick people," Miss Jacqueline Deegan, V.N.A. Supervisor of Coordinated Home Care, said. "It is another dimension of continuing care in addition to chronic care hospitals,

(Continued on Page 8)

Marianne Gilson, RN, of the Visiting Nurse Association, adjusts a brace for Mrs. Philomena Alejata of East Boston, who had been paralyzed on her right side.

DESIGNED TO TREAT PATIENTS WH

Miss D'Alessandro tells Miss Nancy DeRonde, RN, charge nurse, of a severe headache that has persisted for about two weeks.

(Continued from Page 1)

triage. The team of receptionists, nurses and physicians decides whether the patient requires immediate care. Thus in a sophisticated, in-depth way, they perform functions previously carried out by the resident physician in charge, long a key person in the MGH's Emergency Ward.

About half the screening clinic patients receive complete treatment on the spot. The rest have their medical histories taken, and tests are performed preparatory to a return visit scheduled on a priority basis for the appropriate clinic. Assignment is made to one of the 60-odd clinics the hospital maintains, such as the ones for skin or allergy problems.

Could Telephone

Having all the necessary information often makes it possible later for the doctor to treat the patient completely when he has his first appointment at the clinic.

“In the past,” Dr. Grossman said, “it was possible for a patient to telephone and receive an appointment three or four weeks away on the basis of whatever he said his problem was. After three or four weeks, he would go to that clinic only to learn he had a different problem from the one he thought. Then he had to wait another three or four weeks for an appointment at the appropriate clinic.”

From appearance at the Ambulatory Screening Clinic to completion of tests, examination, and treatment averages 90 minutes, relatively short for a busy clinics system.

Tests to aid the physician in making a disposition are done on the spot, and he receives the results before the patient leaves.

The clinic began on a pilot basis last Feb. 17. Since then, about 9,000 patients have opened its glass door on the first floor of the Clinics Building.

Has Helped

Has the screening clinic helped relieve the load on the Emergency Ward? Since a little more than half the Ambulatory Screening Clinic's patient load is siphoned from the Emergency Ward, the screening clinic obviously has helped.

In addition, Emergency Ward patients who used to telephone that ward for test results – if referred now to the screening clinic for follow-up – call the screening clinic itself, thus freeing additional Emergency Ward time.

“Yet the major Emergency Ward problem occurring from 5 to 9 in the evenings, and on holidays and weekends, remains unrelieved,” Miss Farrisey, Clinics Executive Officer, said. “These are the hours that the screening clinic is closed.”

The clinic is gearing itself to opening in the evening hours. If accomplished, this would provide much more assistance to the harried Emergency Ward.

Other Benefits

“Even so,” Dr. Stoeckle said, “the problem of the Emergency Ward will not be solved by the screening clinic alone.”

The reason is that the clinic sees only adult medical patients. To provide maximum benefit, other provisions

Dr. John E. Franklin examines patient.

RE NOT SEVERELY ILL

Toni Garcia, laboratory technician, performs tests and has results before patient leaves clinic. No tests were required for Miss D'Alessandro.

would be required for children and for surgical cases.

Besides whatever aid it offers the Emergency Ward, the new unit achieves other benefits.

- It helps differentiate the degree of illness so that those requiring more immediate care can receive it.
- By centralizing the means for patient entry into the clinics system, it helps standardize the quality of care. (Levels of care tend to be uneven in the various clinics of many hospitals.)
- By providing tests and history taking before the appointment with the specialist, it makes the clinics system more efficient.
- The setting of the screening clinic allows for greater use of a wider range of the professional staff in treating ambulatory patients.
- It offers a setting for more effective training of the staff.

Available at All Times

"We are faced in our country," Dr. Grossman explained, "with a problem in the delivery of ambulatory care. I think it an important part of the training of those who are going to go out delivering care to the population that they have experience and training in the treatment of the ambulatory patient.

"In the screening clinic a member of the senior staff is available at all times and in a setting which is appropriately staffed by paraprofessionals. [Dr. Stoeckle added that 'this is the only place I know of in the United States where in the initial reception of patients the senior staff and clinical fellows work alongside residents-in-training.']

"Thus we can expose the young doctor to some of the newer techniques in ambulatory care. Hopefully, this will stimulate interest in those problems of ambulatory care which represent the bulk of the demands for care in this country."

Dr. Stoeckle credits a number of people besides the members of the Administrative Committee for their assistance in starting the screening clinic. Among them are Henry J. Murphy, Associate Director; Miss Farrisey; Dr. Earle W. Wilkins, Jr., Chief of the Emergency Services; Dr. Charles H. Weingarten, former Associate Chief of the Medical Clinic; Dr. William E. Strole, Jr.; Dr. Cyrus C. Hopkins, Chief Resident in Medicine; and Drs. Jay H. Sanders and Kenneth I. Shine, former Chief Residents in Medicine.

Four Categories

He sees the overall clinics program – as well as the screening clinic itself – as significant.

"We have our patients divided into four categories of care," he said. "First there is the Ambulatory Screening Clinic to screen the patients. Then we're running a diagnostic study clinic for new patients.

"We're also running chronic-disease care in the many different kinds of specialty clinics and in the medical clinics. The fourth category is in the Emergency Ward where emergencies are treated."

John Murray, unit clerk, looks over prescription written by physician for treatment of headache. Had a follow-up appointment been necessary, Mr. Murray would have arranged it.

Schizophrenia: The Search for a Biological Cause

(Continued from Page 1)

dren. If they could find children who were separated from their parents at a very early age, they would in essence have youngsters who owed their inheritance to one set of parents and shared their environment with another.

The scientists decided to do the study in Denmark, a small country with excellent records and enlightened government officials. Aiding them was Dr. Fini Schulsinger of the Psychological Institute of Copenhagen, and Chief of Psychiatry at the Kommune Hospital.

Victim Withdraws

In the course of study the Kety group came to realize more than ever that schizophrenia is not a homogeneous disorder. They included three types in their sample.

One is the long-lasting, classical type in which the victim progressively withdraws from his environment and reality. Another is an acute schizophrenic reaction which comes on suddenly but neither lasts very long nor recurs.

The third classification is borderline schizophrenia in which the person requires relatively little or no time as a patient in a mental hospital. In many cases such individuals are never hospitalized, but despite some bizarre thought patterns and unrealistic attitudes manage a sort of adaptation to society.

Inadequate Personality

"We began to realize," Dr. Kety said, "that even these three categories are not enough, that they were blending into one another and that the borderline schizophrenia was blending into another category which is called by American psychiatrists 'inadequate personality.'

"A person with inadequate personality has an even milder personality disorder than one who is a borderline type. It is sometimes only on the basis of a long psychiatric interview or extensive knowledge of his life experience that one can make a diagnosis of borderline schizophrenia or inadequate personality."

Team members studying the families were purposely not told whether they were dealing with adoptive relatives or biological families. Nor did they know whether they were interviewing families of normal adoptees who were chosen as matched controls.

Strong Implications

The only concentration of schizophrenia-related disorders turned out to be in the biological families of adoptees diagnosed as schizophrenics. This finding supports the operation of genetic factors in the causation of schizophrenia.

It is well known that when they are raised at home 10 to 15 percent of the children of schizophrenics themselves become schizophrenics. While preliminary, Dr. Kety's results provide strong implications:

"Our study suggests that much less than that percentage will become diagnosable as schizophrenic," Dr. Kety said, "if those children are adopted by other people. Although we are still in the process of testing it, this has raised the possibility that perhaps adoption is a good thing for the children of schizophrenics.

Random Chances

"If schizophrenia depends on both a genetic and an environmental factor, then in the natural families of schizophrenics there are both the genetic and the environmental factors. Now the odds change if one takes a person born of a family with a genetic predisposition to schizophrenia and transplants him at random to another family.

"The chances that the adopting family will have the environmental factors necessary for schizophrenia are no greater than the chances of any household at random having them. Transplanting him should, therefore, diminish the risk if our preliminary findings are proved."

On the basis of their data thus far, the Kety group believes that a personality type vulnerable to schizophrenia, and not schizophrenia itself, is passed on genetically.

"Whether he becomes schizophrenic," Dr. Kety said, "could depend on what life situation he meets and what environments he faces.

"There's also evidence from other studies – not from ours – that creativity seems to run high in the families of schizophrenics. . . . It may very well be that the same genetic trait that produces schizophrenia in one person produces creativity in another, depending on other genetic factors or on his environment."

This sort of schizophrenia found in the blood relatives of adoptees covers the whole spectrum – a few chronic schizophrenics, many borderline cases, and several inadequate personalities.

"The observation that a spectrum exists in the families of even clearly diagnosed schizophrenics," Dr. Kety said, "doesn't prove that environmental factors are also important, but is certainly compatible with that interpretation. An alternative explanation which hasn't been ruled out is that even a disorder which is almost entirely inherited could still show such a spectrum if it were a complex genetic disorder.

Combination of Factors

"That is, if it were not just due to a single gene [a unit of inheritance] but were due to 100 genes. Then some people would be born with a heavy

SEYMOUR S. KETY, MD

loading, some with a light loading. That is still a possibility.

"The other possibility is that it is a combination of genetic and environmental factors. That is more logical and more compatible with other information. For example, the severity of the illness is less when adoption intervenes than when the child is raised in its own family."

Supported at the MGH by a new NIH grant, Dr. Kety is directing a continuing study with his Danish and NIH colleagues to learn more about possible environmental factors. The Danish field team is conducting two- or three-hour interviews with the adoptive and blood relatives of the schizophrenic adoptees and the control group.

Possible Differences

The interviews come back to the MGH in summaries of more than 30 pages covering the entire life experience of the individual.

"We hope to be able to reconstruct as many environmental factors as we possibly can," Dr. Kety said, "to see if there are any possible differences in those families that have reared a schizophrenic and those which have not."

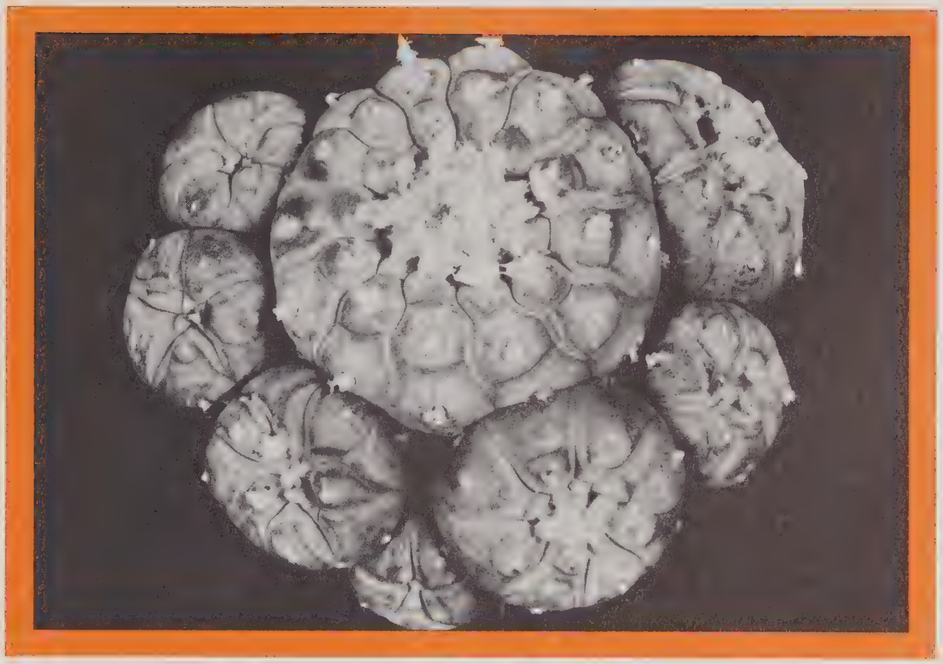
Enough evidence concerning the role of inheritance has accumulated so far to convince the MGH Psychobiologist and Harvard Medical School Professor of Psychiatry he is justified in looking for biological factors as at least a contributory cause.

One of the major areas of this search involves a highly technical process known as transmethylation.

Virtually all drugs which produce deep and long-lasting mental disorders such as schizophrenia are compounds containing the methyl group. A lot of these started out as nonmethylated substances that occur normally in the body, but which were changed through transmethylation. This involves the transfer of a methyl group from one compound to another.

Used by Indians

One of the most interesting of these drugs is mescaline, the active ingredient of peyote. A drug obtained from a cactus plant, peyote has long been used by Mexican Indians to produce a strange state believed to resemble schizophrenia. It is interesting that if the important amine found in the normal brain, dopamine, is methylated in three positions it becomes mescaline.



The peyote cactus which has an active ingredient called mescaline. Mexican Indians have long used peyote to produce a strange state believed to resemble schizophrenia. (Photograph courtesy Botanical Museum of Harvard University.)

When transmethylated, other compounds also gain the capability of causing hallucinations similar to those of schizophrenia.

"Several years ago," Dr. Kety said, "we thought that one way of testing the transmethylation hypothesis was to see whether we could speed the process up. If this were responsible for schizophrenia, then speeding it up should increase the symptoms briefly."

Transmethylation depends on a substance called s-adenosylmethionine, which is an active form of a basic substance called methionine.

Rigorous Control

"Methionine," Dr. Kety said, "is crucial to transmethylation, and our hypothesis was that if we gave large amounts of methionine we could perhaps increase the amount of transmethylation which was going on. And if in a schizophrenic this was producing abnormal compounds like mescaline, the schizophrenic would show this – a change in symptoms."

Under very rigorous control, Dr. Kety's group tested this idea in a population of schizophrenics at the Mental Health Institute. Both the patients and their families gave their consent.

Dr. Kety's group found that in some of the patients large doses of methionine did indeed cause an intensification of symptoms that lasted about one day. After stopping the dosage, the group found the patients returned to their previous mental state.

While at the NIH, Dr. Ross J. Baldessarini, an associate of Dr. Kety, developed a sophisticated method for measuring s-adenosylmethionine in the brain and in other tissues. Dr. Baldessarini, who is now at the MGH, found that by feeding methionine to animals, he could in fact increase the amount of s-adenosylmethionine in the brain and liver.

Since methionine is required to produce s-adenosylmethionine, it was obvious that the methionine fed to the animals caused the increased s-adenosylmethionine which in turn is crucial to transmethylation.

Now Steven Matthysse, Ph.D., of Dr. Kety's group at the MGH is exploring a number of possible ways that transmethylation might be involved in schizophrenia. He is examining transmethylation processes in patients' white cells cultured in test tubes. Any generalized defect that permits transmethylation should show as clearly in white cells as in the brain.

Dr. Matthysse is testing the ability of white cells from schizophrenics to perform transmethylation, and he is doing the same with the white cells of normal persons to see if there is a difference.

Such basic research could one day point the direction for better treatment and perhaps cure of schizophrenia.

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To Cut Costs, Increase Morale, Free Beds

(Continued from Page 3)

nursing homes, and extended care facilities. It is not a substitute for these, but rather another alternative."

Placement of a patient in the program is decided on the basis of the services from which he can benefit, and whether it is feasible for Coordinated Home Care to provide them. The services are available to patients regardless of ability to pay. Blue Cross, Medicare, Medicaid and Workmen's Compensation include home care among their benefits. Commercial insurance companies usually pay 75 or 80 percent of the cost.

Miss Joanne O'Brien, Nurse Supervisor in the Transfer Office, who is MGH liaison with the V.N.A., said that there has been a shift in thinking of resources for referral after hospitalization. Over the past five years, there has been close to a 50 percent increase of referral of patients to home care.

Miss Alice Dempsey, General Director of the Visiting Nurse Association of Boston, said that for the past ten years similar programs have been evolving around the country. Community agencies like the V.N.A. and county health departments have been coordinating services with hospitals to provide more intensive, specialized care than mere visitation, a widespread practice that has been going on for many years.

"In the past, hospitals just referred patients to community agencies. Now there is an attempt to bring the personnel of both community agencies and hospitals together to provide this more specialized care."

The impetus for such a program in Boston came from Blue Cross, which recognized the value of offering these benefits to its policyholders. A community committee was brought together to formulate a program. It was decided to have the V.N.A. administer the services because their reach was wider than that of any one hospital.

In the first phase, the V.N.A. contracted with the MGH, the Carney Hospital in Dorchester, and the Faulkner Hospital in Jamaica Plain. The V.N.A. plans to extend the program to other hospitals within the next year. (Two Boston hospitals, the Peter Bent Brigham and the Beth Israel, have similar but hospital-based programs already.)

Since Coordinated Home Care was implemented at the MGH last summer, 100 patients have benefited from its services. Most of them require at least a daily visit from a nurse.

Miss Eleanor Clark, Director of the Social Service Department, emphasized the importance of early referrals:

"If the patient goes home without Coordinated Home Care planning, he may well be unable to cope with the situation. On the other hand, if home planning is involved from the start, a smooth transition from hospital to home can be effected. That is why it is so important to provide appropriate patients with home care from the beginning."

Miss Deegan and Miss O'Brien feel that more patients could qualify for the program, but they are not being referred because the hospital staff is not always aware of the program's possibilities.

"Once professional personnel participate in the program, they are enthused about it," Miss O'Brien said. "But many are not aware of how it operates and of its value.

"Often families can do a better job of caring for patients than institutions," she said. "They provide an ingredient that institutions cannot give in the same way – loving and caring."

After hospitalization and a stay in an extended care facility, Mrs. Alejata has received physical therapy and gait training as well as nursing through Coordinated Home Care. Here, Miss Gilson helps her exercise her wrist.

MGH News

Vol. 29 No. 9 MASSACHUSETTS GENERAL HOSPITAL, BOSTON, MASSACHUSETTS November, 1970

A Chance to Prevent 200,000 Deaths a Year

The *MGH News* is initiating a national campaign to educate the public about heart attacks.

Heart specialists interviewed by the publication agree that such a program could potentially prevent the death of up to 200,000 Americans each year.

The project, endorsed by famed MGH heart specialist Dr. Paul Dudley White, seeks to enlist the support of the mass media, industry, service organizations, the American Heart Association, and federal, state and local governments.

A seeding operation, its main thrust is aimed at organization on the community level. It is hoped that interested communities would evolve their own programs, spurred on and guided by suggestions outlined in this issue of the *News*.

The immediate goals of the campaign are two:

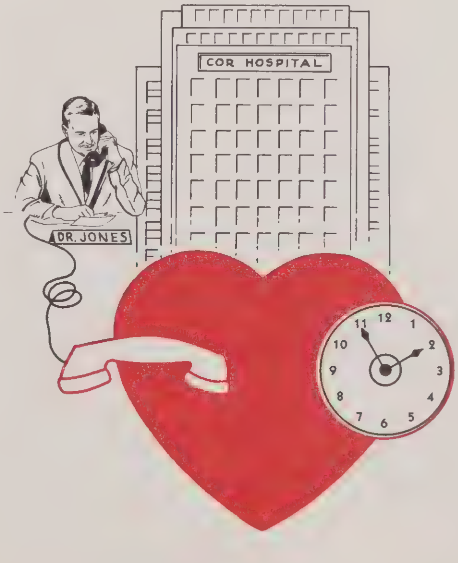
1. To publicize the signs of a heart attack in a way least likely to cause undo concern. Aided by MGH cardiologists, the *News* has prepared a simple chart for this purpose (page 8).

2. To clarify for the public the fact that hospitals can now help save most people who enter after heart attacks, and that those saved can very often lead normal lives. Former Presidents Eisenhower and Johnson, among many thousands of others, returned to their hectically "normal" lives after heart attacks.

Both goals face in one direction – moving people with suspected attacks to seek immediate help. Prompt hospitalization during likely attacks is the key to saving lives.

"The early hours of an attack are

(Continued on Page 3)



See Chart on Page 8

Tricking the Body into Accepting Transplants

(Ninth of a Series on Basic Research)

Scientists appear to be learning how to trick the body into accepting rather than rejecting transplants.

In fact, an MGH surgical resident and his colleague have already isolated the substance they believe will make this possible.

"We're probably a few years away from trying it in humans," Dr. Barry D. Kahan said. He emphasized that it would be some time before the technique could be ready for routine use in transplantation.

Getting control of the rejection phenomenon, however, would be a milestone in transplantation surgery. Rejection has proven the greatest stumbling block to successful transplants.

Only identical twins, whose tissues are genetically the same, can exchange organs without fear of this phenomenon. Chances of rejection tend to grow as the blood relationship between donor and recipient lessens.

To prevent this lethal result, surgeons use drugs that suppress the phenomenon. The trouble is that these "immunosuppressives" place the patient on a tightrope.

Too much pushes him off one side of the rope by making him overly susceptible to infection. Too little shoves him off the other by allowing the body to reject the foreign object. Striking the proper balance has proven the most uncertain of arts.

What causes rejection is the body's defense mechanism against foreign objects. All living objects, whether viruses or tissues derived from animals, contain something called antigens. Usually made of proteins, they become invaders when they enter different living organisms such as the human body.

Through a little-understood method of detection, the body recognizes the invader and stimulates its own defense system. The big defensive missiles manufactured in response to need are called antibodies. These antibodies are fired on a seek and destroy mission.

When the antigens killed are part of a viral disease that is also slain, the result is beneficial for man. Not so when the object of the attack happens to be a kidney or heart transplanted to keep its recipient alive.

What Dr. Kahan and others would like to do is to prepare a transplant

(Continued on Page 6)

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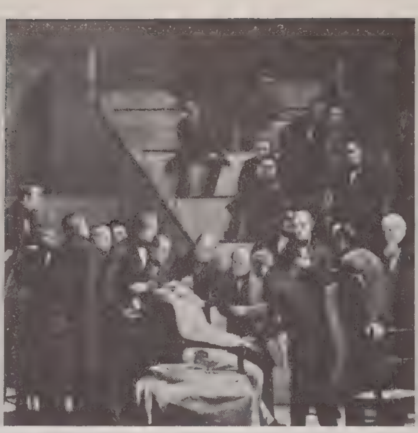

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EDITORIAL:

Seeking Immediate Medical Help

Improvements in treating heart attacks have taken both medical and surgical routes in recent years. The medical ones aim largely at preventing potentially fatal irregularities in the heart's rhythm and stopping them quickly if they do start. The common surgical approaches seek to repair diseased arteries. No medical advances, however, help the patient who fails to call his doctor immediately when he suffers a heart attack. Each year there are one-quarter million otherwise healthy Americans under 70 years old who die outside hospitals during heart attacks.

To encourage them to seek immediate medical help is the aim of a campaign announced in a page 1 article. A chart appearing on page 8 forms the backbone of this attempt. The chart tries to reach beyond the listing of signs of a heart attack. It also describes other circumstances which make it unlikely that the pain a person is experiencing stems from an attack. By the juxtaposition of simple symptoms and countermanding circumstances, the chart is designed either to warn persons when they might be having an attack or to reassure them when this is unlikely. Another purpose of the chart is to emphasize that immediate medical attention can be of lifesaving value.

To bring the chart to the attention of the American public, the *News* asks the cooperation of thousands of people. Newspapers, radio stations and television channels can be of infinite assistance. Industry, service organizations, local heart associations and school systems could prove invaluable in distributing charts. Governmental groups such as the Regional Medical Programs on Heart, Cancer and Stroke could help communities in their regions to organize. The chart could be publicized on billboards and displayed in telephone booths, public transportation stations and conveyances, industrial plants, public washrooms and the like. Industry can be especially helpful in urging employees with apparent heart attacks to seek immediate medical attention. Such help is especially needed by those who, for one reason or other, minimize their symptoms. (Story on page 4.)

The medical profession itself can aid in another way. A successful educational campaign would place increased demands on facilities. Since good statistics are lacking, medicine will have to cope with a problem of undetermined magnitude. Given his stubborn nature, however, man seems unlikely to suddenly swamp his already overworked medical care system.

To cope with heightened demand, the health profession needs this time lag to add equipment and trained personnel. In the long run changes may be needed all along the line. The patient lacking a family physician, for example, has to know how to find help in an emergency. Each community could include such information in its own public education campaign. One study showed that the physician sometimes adds his own delay to that of the patient. When a patient describes suspicious symptoms, the physician can expedite care by immediately ordering him to the hospital. Improved ambulance service may prove necessary in many communities. Once the patient arrives, hospital emergency wards must speed up the admission. More trained nurses and equipment will eventually be needed to expand some existing coronary care units.

Hospitals lacking such units may wish to consider establishing them. Many hospitals will have to provide more roving monitors for heart patients unable to be accommodated in coronary units, and nurses in regular wards must be trained in the use of monitors and in emergency techniques. With the nursing shortage, this last may prove one of the greatest problems.

The *News* does not wish to minimize either the difficulty in making public education show results, or the new problems which those very results could themselves engender. What this publication desires is to emphasize that the potential in lives saved is worth the effort.

Preventing Deaths Through Public Education

(Continued from Page 1)

by far the most dangerous ones," said Dr. Roman W. DeSanctis, an MGH cardiologist and Associate Clinical Professor of Medicine at Harvard Medical School.

Never Reach Hospital

Dr. Charles A. Sanders, Program Director of the MGH's Myocardial Infarction Research Unit and Associate Professor of Medicine at Harvard Medical School, said an estimated 750,000 Americans die each year of heart attacks. Of these, 250,000 are either over 70 years old or suffer from other serious illness in addition to heart disease.

The remainder, roughly one-half million, are otherwise healthy and may range in age from their teens to their late 60s at time of death from heart attacks.

"Half of those who die never get to a hospital," Dr. Sanders said. Eighty percent of those who do reach hospitals survive.

By far the major difficulty is the patient's attitude (story on page 4). Dr. Thomas P. Hackett, an MGH psychiatrist and Assistant Professor of Psychiatry at Harvard Medical School, has investigated this problem intensively for many years.

Delay and Deaths

After a study of 100 heart-attack victims who were hospitalized at the MGH, he and an MGH colleague, Dr. Edwin H. Cassem, concluded in the *American Journal of Cardiology:*

"If the population at large responds to the first symptom of myocardial infarction [heart attack] in a manner similar to the patients we have described, there is little doubt that delay contributes heavily to the national death rate." (Another study done in Rochester, N.Y., showed very similar results.)

The delay is especially surprising considering the usual severity of the chest pain accompanying a heart attack.

Incredible Lag

"The time lag is incredible," Dr. Hackett said. "It's true that they don't delay to the same extent that a cancer patient does . . . but the person having a heart attack who delays 6 or 12 hours in seeing a doctor may be the equivalent of someone who delays three to six months before seeing a doctor about a growth that might be cancer."

The *MGH News* welcomes letters from its readers. To avoid condensation, letters should be brief and must be signed. Names will be withheld on request.

At least half the deaths from heart attacks occur within the first four hours. Yet, according to various studies, about half the patients who do reach medical assistance delay longer than that – often much longer. And, in fact, they should seek help in the first few minutes because the first hour is by far the most critical.

"A lot of people don't respond to chest pain," Dr. Hackett said, ". . . because they do not want to believe they are having a heart attack. Those who suspect their pain is a myocardial infarction regard their illness as fatal. They think that nothing can be done once they are taken to the hospital."

Powerful Muscle

This negative attitude, Dr. Hackett believes, leads the patient to blame his chest pain on indigestion or any other plausible cause.

Actually, the heart is a powerful muscle with amazing recuperative powers.

Because of a better appreciation of the heart's resiliency, plus improved treatment, the trend is to require less bed rest.

A few years ago, the doctor would order four to six weeks of virtually immobile bed rest after an attack. Now, barring complications, the patient is likely to spend from two to three weeks in bed. Even during this period of confinement, he is allowed more freedom of movement than ever before.

The Coronary Care Unit (May, 1969, *MGH News*) has provided one of the major advances in care of the heart-attack patient.

Improved Care

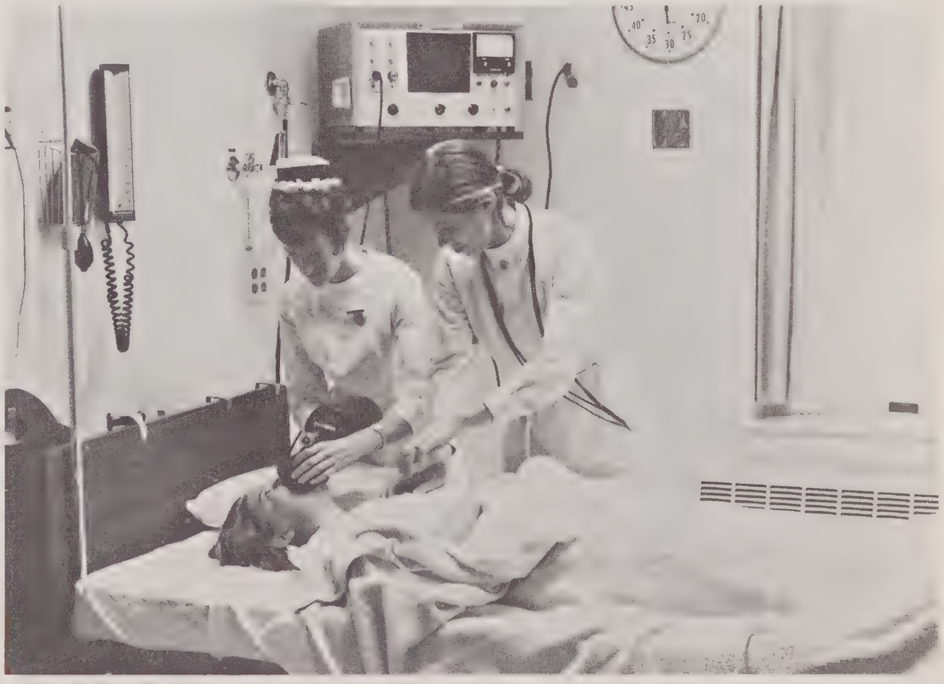
"Sudden death from heart attacks," Dr. Sanders said, "is almost invariably the consequence of an arrhythmia [an irregularly beating heart] which coronary care units are designed specifically to treat."

Such units have even become common in many community hospitals. What's more, the application of coronary-care principles has resulted in improved care of heart-attack patients assigned to other areas of a hospital. This is especially true for hospitals which have some form of coronary care unit.

"The Coronary Care Unit," Dr. DeSanctis said, "has reduced the hospital mortality in myocardial infarction between 10 and 15 percent."

(Related stories on pages 4 and 5)

(See Chart on Page 8)



If heart stops, the nurses are trained to work in tandem. With an employee modeling as a patient, Coronary Care Unit Charge Nurse Miss Margaret Von Colln, RN, demonstrates use of an ambu bag to squeeze air into the lungs, while Miss Sally Reese, RN, demonstrates massaging of the outside chest wall with the heel of her hand.

Those Who Deny Despite Major Evidence

A chest pain began to grip the large, rawboned longshoreman. "Indigestion again," he thought.

The 59-year-old, who smoked four packs of cigarettes a day, decided to ignore the pain, thinking it would disappear.

Four days later it had grown much worse. He still would have ignored it had not his wife summoned an ambulance. The man entered the MGH with his heart massively damaged from a heart attack.

He is what Dr. Thomas P. Hackett classifies as a major denier – someone who despite overwhelming evidence denies to himself that he is having a heart attack.

In studies by an MGH group led by Dr. Hackett (related story on page 1, column 3), a large percentage of patients who reached the hospital after an attack had recognized their own symptoms. Such patients tended to get there quickest.

Another large percentage, however, denied to themselves that their symptoms arose from their hearts. These people came to the hospital because someone else recognized the symptoms.

"If you happen to have your heart attack at your place of business or in the presence of a policeman," Dr. Hackett said, "you are fortunate because then it is more likely your employer or the policeman will make certain that you get immediate medical attention."

Drs. Harry S. Olin and Hackett were obviously concerned with the magnitude of the problem of denial when they wrote in the *Journal of the American Medical Association* after a study of 32 heart-attack patients:

"In the acute phase of a myocardial infarction, one cannot help but wonder, on the basis of this study, how many patients die simply because they have no one available to correct [their mistaken thoughts]."

For major deniers, the help of an insistent employer, business associate, friend, or family member thus becomes critical.

In their *American Journal of Cardiology* article on 100 coronary care unit patients, Drs. Hackett and Edwin H. Cassem wrote:

"For the largest number of patients [who denied they were having a heart attack], a family member made the decision [to seek medical aid]. Spouses seemed to be less successful in reducing delay than friends or associates. The most influential person in reducing delay in our series was an unrelated friend or stranger who was not associated with the patient's work. . . . In a number of instances it was an insistent employer who literally ordered the patient to the hospital."

Drs. Hackett and Cassem also reported in their *American Journal of Cardiology* article:

"Patients who recognized the true source of their trouble [as a heart attack] came for help much sooner. . . . The group who interpreted their symptoms simply as not coming from the heart delayed the longest, by far."

The case history of a 50-year-old shirt salesman who was awakened at night by a "terrific, crushing pain" in his chest is fairly typical. He blamed his pain on pickled herring he had eaten for supper and took an antacid. It was only after the "indigestion" continued unabated that his wife could persuade him to go to the hospital.

Other findings reported in the article:

- The more severe the chest pain, the more quickly the patient sought help. In fact, though, the person who felt he was suffering a great deal of pain did not necessarily experience the most severe heart attack. It turned out that there was no relationship between the actual severity of the attack and the length of the delay.
- Delay was relatively independent of the patient's age, sex, extent of education, history of previous heart attacks, or socioeconomic status.
- If shortness of breath was a symptom, the patient tended to seek help more readily. A man who had ignored chest pains for several hours telephoned his physician when his breathing became labored.

"If it doesn't affect your breathing," the man said, "it can't be your heart."

Although sudden shortness of breath may accompany a heart attack, many attacks come without breathlessness.

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Clock in a room of the Coronary Care Unit records time elapsed since an acute heart problem detected by the patient monitor.

Nature Often Predicts A Heart Attack

Nature often predicts a heart attack.

By producing a chest pain resulting from a condition called angina pectoris, she often warns a potential victim days, weeks, months or even years in advance. But given proper care – medication and the right diet, for example – the patient may never suffer the heart attack. And in more severe cases, modern surgery may alleviate the condition.

An insufficient supply of blood bearing oxygen to the heart causes angina pectoris, Latin for chest pain.

What reduces the vital blood supply is the narrowing of one of the three major coronary arteries which carry blood to the heart. Fatty materials accumulate along the interior walls of arteries, building up until they reduce the diameter of the passageway.

Even with a narrowed coronary artery, a man may theoretically escape the pain of angina indefinitely. As long as the reduced supply of oxygen reaching the heart remains sufficient, he escapes angina.

Anything that increases the heart's need for oxygen beyond the supply will cause the pain. An increased heart rate makes the heart demand more oxygen.

Exercise, excessive emotion, breathing very cold air, overeating – all these boost the heart rate. If emotion sets off the fast beat, relaxing will slow the heart and eliminate the pain of angina. If eating sets off the heart, lying down will eliminate the resulting pain. Stopping the exercise does away with pain from that source. Coming in from the cold removes the pain when it is cold air that agitates the heart.

Chest pain arising from angina may resemble, or exactly mimic, that of a heart attack.

(Continued on bottom of next column)

"Should Be Almost Completely Preventable"

A frequent complication of the heart attack is often implicated in sudden deaths.

This complication is called arrhythmia.

The heart attack itself occurs when oxygen-laden blood is suddenly prevented from reaching the heart muscle. In most cases, the blockage results from a blood clot that becomes trapped in an artery narrowed by disease (see accompanying story). For a heart attack to take place, blockage must occur in one of the three coronary arteries which carry blood to the heart.

Such a blockage lasting for any length of time damages the area of the heart deprived of blood. This area of damage is called myocardial infarction, the medical term for a heart attack.

If a large enough area of the heart is damaged, the heart muscle may slowly deteriorate until it can no longer pump sufficient blood to sustain life.

Death under those circumstances comes gradually over a period of days. Or the badly damaged heart may degenerate into a frequently fatal condition called cardiogenic shock. When arrhythmia results – no matter how small the area of damage that for some unknown reason causes the irregularity – death may strike quickly.

Arrhythmia is an irregularity in heartbeat. There are many kinds of irregularities. In the case of sudden death involving heart attacks, one particular type is most often to blame.

This is called ventricular fibrillation and comes when the left ventricle, the lower left heart chamber, starts beating irregularly, looking much like a sac of worms.

Irregularities in the rhythm of the left ventricle are the most dangerous because that happens to be the chamber which works the hardest. It is the left ventricle which must pump the blood containing fresh oxygen from the heart to the aorta, the main artery which carries blood to nourish the rest of the body.

Fortunately, it is ventricular fibrillation which best lends itself to treatment in a coronary care unit.

"The danger of developing ventricular fibrillation," Dr. Roman W. DeSanctis said, "is almost 20 times greater in the first hour after the appearance of a myocardial infarction than in the next 24.

"That is why prompt hospitalization is so important. Death from sudden, unexpected ventricular fibrillation should be almost completely preventable in this day and age."

Ventricular fibrillation remains a very grave, though decreasing, threat for the next five days. Unless complications ensue, the doctor usually transfers his patient from the Coronary Care Unit to another section of the hospital when the danger has lessened.

During the stay in the Coronary Care Unit, the patient is linked to a cardiac monitor which sounds a "bleep" with each beat of the patient's heart. A screen, which forms part of the monitor, traces the electric pattern of the heartbeat.

The combination of sight and sound should be reassuring to the patient (*New England Journal of Medicine*, Dec. 19, 1968; Coronary Care Unit). It guarantees that his heart is being monitored every second of the day.

Should the beat become irregular, a skilled nurse stands but a few feet away, ready to respond to the resultant alarm. She uses a defibrillator, a device which sends a strong electric current to stimulate the irregular heart. The current usually shocks the "sac of worms" into resuming its normal beating rhythm.

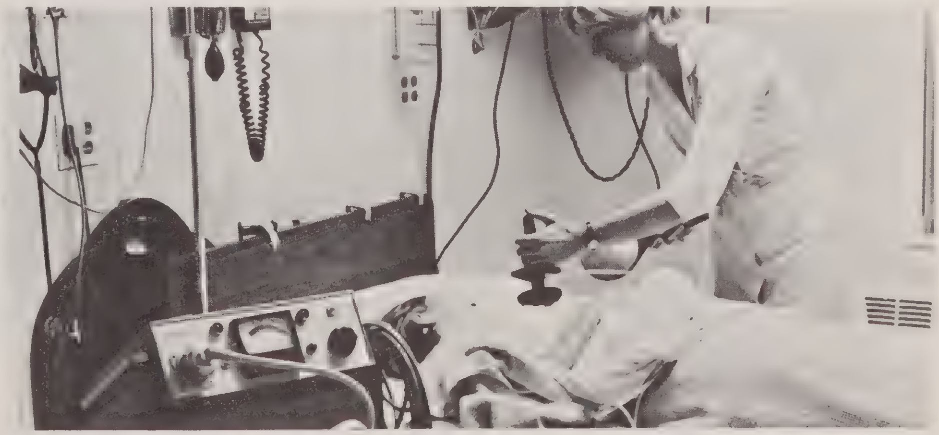
Should the heart stop, the nurses are trained to work in tandem. One gives resuscitation while the other massages the outside chest wall with the heel of her hand.

In many hospitals, "roving" cardiac monitors are hooked to heart patients who are not in coronary care units. The MGH, for example, maintains 45 of these for patients who have "graduated" to regular rooms. There are 37 in cardiac and other intensive care units.

Nurses throughout the hospital are trained by Coronary Care Unit nurses and by cardiologists in caring for those who have suffered heart attacks. Nurses on regular floors also learn resuscitation.

At least two studies show that persons resuscitated after severe ventricular fibrillation live nearly as long as others whose similar heart damage escaped the complications of arrhythmia.

Medication is also given to reduce the likelihood of arrhythmia recurring.



Miss Lynda Ross, RN, demonstrates defibrillation on the model. "At least two studies show that persons resuscitated from severe ventricular fibrillation live nearly as long as others whose similar heart damage escaped the complications of arrhythmia."

(Continued from Page 4, Column 3)

"Duration of the pain is the difference," Dr. Charles A. Sanders said.

If the pain fails to disappear two or three minutes after lying down following a meal, or two or three minutes after exercising, the odds suggest a heart attack (see adjoining story).

Someone under a physician's care for an angina condition might take a nitroglycerin tablet to relieve the pain. Failure to gain quick relief also suggests a heart attack.

Angina attacks tend to come more often and become more severe before a heart attack. Because they are often good predictors of such an event, angina-like pains should be reported by patients the first time they notice them.

Reporting angina lacks the dire urgency of reporting a heart attack itself. Even so, a call to the doctor within a day of the first suspected angina is considered important.

"Perhaps with appropriate treatment," Dr. Sanders said, "a heart attack can be staved off completely, or at least treated more expeditiously.

"The average patient may live many years after developing angina."

Tricking the Body into Accepting Transplants

(Continued from Page 1)

recipient to accept the donated organ. They plan to achieve this by giving an advance sample of the donor's antigens to the prospective recipient. Then, when the actual transplantation takes place, the recipient's defenses would recognize the antigens as belonging to a sort of friendly aircraft – not one requiring an attack from antibody missiles.

Everyone harbors a large number of different antigens of varying strength. It is relatively easier to keep the weaker antigens from triggering an antibody attack with a small amount of the powerful immunosuppressive drugs.

Therefore, scientists are not too concerned with the weaker antigens. It is the stronger ones that they especially want the recipient's body to accept as friendly.

The first step is to extract these stronger antigens from a prospective donor of human tissue.

Humans present a difficult situation since the other organs of the living donor cannot be sacrificed to extract these substances.

Buffalo, N.Y., scientists leaped over this hurdle. They obtained a variety of white blood cells called peripheral lymphocytes from normal humans. By "culturing" these in substances especially conducive to their growth, they were able to grow large quantities.

The next giant step required was to extract the strong antigens out of these peripheral lymphocytes. This is where Dr. Kahan entered.

After an internship in surgery at the MGH in 1965-66, he did the major work of isolating the antigens while at the National Institutes of Health in Bethesda, Md. With Dr. Ralph A. Reisfeld, who also was then at the NIH, he was able to get the strong antigens out of the peripheral lymphocytes.

They devised two of the methods used to isolate the antigens from their position as integral parts of the surface of peripheral lymphocyte cells.

One way is to treat the cells with a special salt solution which tends to disrupt the forces between the antigen molecule and the cell surface and release the antigen into the salt solution.

The other method involves a low-frequency hum. First, the peripheral lymphocyte cells of which the antigens form an integral part are suspended in a fluid. A laminated rod which vibrates at a given frequency transmits the resultant sound into the vessel containing the fluid.

As the sound passes through the fluid, it generates waves which free the antigen proteins from the surface of the peripheral lymphocyte cells.

By carefully regulating the energy of the sound and the length of exposure of the cells to the sound, the antigens can be freed without being destroyed.

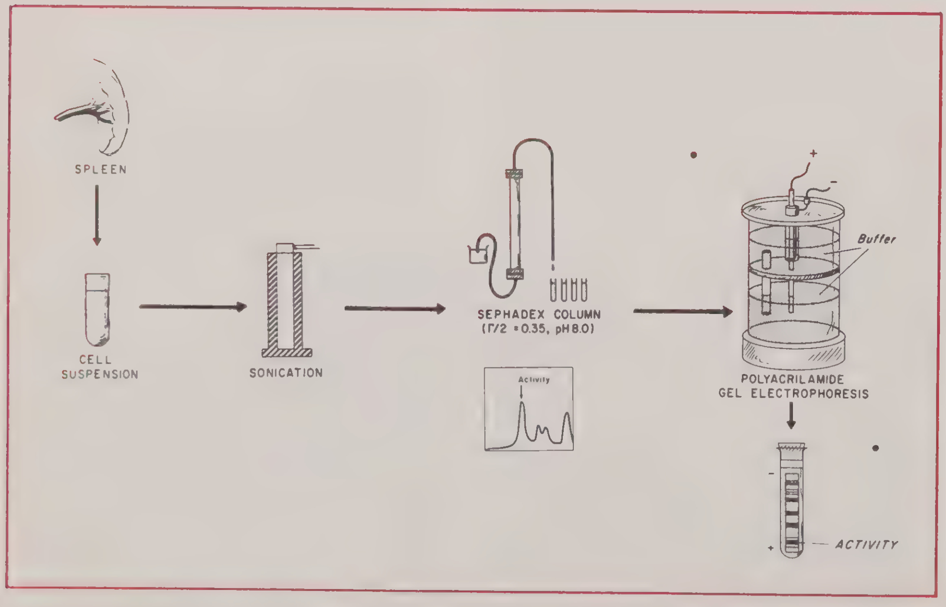


Diagram showing steps in purification of antigens from human spleen. Cells extracted from spleen are first suspended in fluid. In second step they are disrupted by low-frequency sound. Next step (not shown) is purification by spinning at very high speeds (centrifugation). Sephadex column shown next separates antigen by size. Final step involves using an electric charge to further separate the antigen. Only one of the many bands resulting from the entire process (the one labeled activity) contains the purified, active portion of the transplantation antigen.

Since the majority of the antigen is strongly bound to the cell surface, only about 30 percent can be isolated in this way. To make up for this lack of efficiency, three times as many peripheral lymphocyte cells must be cultured as are needed.

The freed antigen-containing protein next must be separated from other material and purified. By spinning rapidly (centrifugation), various debris and the thin layers of tissue called cellular membranes are removed.

The antigen is separated by filtration through gel beads and then by application of an electric current. One method thus separates on the basis of size, the other on the basis of electric charge.

These methods that had worked with mice and guinea pigs were tested in collaboration with Dr. Ruggero Ceppellini, an Italian professor of medical genetics at the University of Turin.

People who had previously received lymphocytes containing known types of antigens from a given donor were then injected with small amounts of purified antigens.

The volunteers developed small skin reactions similar to those found in the test for tuberculosis. The reactions were specific for the type of antigens injected, thus showing recognition by the recipient of the purified antigens.

The test thus proved that the material isolated and purified is indeed capable of arousing a response from the body's protective antibodies. At the same time, the test showed that low doses of these antigens are not harmful. To achieve their ultimate purpose of preparing a prospective recipient for a transplant would require a larger amount (perhaps a few milligrams).

Other groups of scientists have used antigens isolated by these methods. They have prepared animals for transplants by isolating antigens from a prospective animal donor and injecting them in a prospective recipient animal.

In one group of experiments, dogs treated this way survived considerably longer than is usual without treatment.

Dr. Kahan and an organic chemist, Michele A. Pellegrino, Ph.D., from Prof. Ceppellini's laboratory, working at the MGH under the general supervision of Dr. Paul S. Russell, Director of Transplantation, standardized the activity of preparations from several lines of cells. They thus developed a battery of antigens of known strength.

Once basic questions about chemical composition of antigens are answered, researchers will be prepared to work with MGH transplant surgeons in providing the antigens for prospective recipients.

The details of how to inject humans to prepare them for a transplant have not been worked out. There are two classical methods immunologists use to get the human body to tolerate a foreign antigen:

One is to accustom the person to having the material around by giving him relatively small, frequent doses, and somehow his immune system readjusts so that he doesn't react to the transplant.

The other way is to inject comparatively massive amounts of the material. With this technique, the person specifically loses his ability to develop antibodies to attack the material.

One of these basic problems is how to keep the recipient alive while he is awaiting a transplant. Hospitals which have dialysis machines to keep kidney patients alive have long waiting lists of potential users.

Miss Diana Di Padua, left, technician, shows Mrs. Louise Steeves of Caribou, Maine, part of equipment used in antigen purification research. Mrs. Steeves was the recipient of a kidney transplant on Dec. 2, 1969.

Giving small, repeated doses of the antigen would take months. During that period the patient would require frequent dialysis time.

A single large dose would reduce or even eliminate the lag period during which the patient's immune system is being prepared for the transplant.

Eliminating the lag could be lifesaving for those who cannot survive months, even with the purifying benefits of dialysis.

International Group Builds on Antigen Work

An international MGH research group in the Transplantation Unit is building on the work of Dr. Barry D. Kahan.

Under Dr. Paul S. Russell as Director of Transplantation, the group is using several sources of human cells for different studies. Some cells have come from human spleens that have had to be removed surgically.

They have also used cells from large-scale cultures maintained by collaborating scientists in Buffalo, N.Y.

The MGH group has been further developing methods for isolating strong antigens from peripheral lymphocytes. Nasir Bashirelahi, Ph.D., of Iran, Assistant in Biochemistry at the MGH, has brought his specialized knowledge of chemistry to the project. Diana Di Padua and Diane Hoye are the technicians.

Dr. Ian McKenzie of Melbourne, Australia, and Elizabeth Davies, Ph.D., of Cambridge, England, research fellows at the MGH, have extended previous studies of these antigens in animal experiments. They have used mice which differ by only one antigen so that the evaluation of the biological effect of the antigen is much easier.

It is known that the chemical state of the antigen prepared from cells can influence greatly its biological effect. The mouse experiments should thus become an important guide to later efforts in patients.

"In this way," Dr. Russell said, "the chemical studies of Dr. Bashirelahi and the animal experiments of Drs. McKenzie and Davies are indispensable."

From Dr. Kahan's work in Italy with Prof. Ceppellini, it has become clear that some fractions of cells are biologically active as antigens in man. They also established that careful testing in patients of such materials does not carry appreciable risk.

The Human Studies Committee of the MGH reviewed this question and gave its approval for carefully controlled tests in kidney transplant patients.

Transplant Research And the Cancer Field

The research described on this page holds out very important implications for cancer investigators.

At first glance this might seem a little farfetched. After all, the investigators have isolated antigens from normal tissues, and cancer cells are anything but normal.

However, it turns out that cancer cells have new antigens on their surface. What's more, these antigens are foreign to the person with the cancer.

In theory, the defense mechanism of the person should make antibodies to fight off these antigens and in the process kill the cancer. For some unknown reason, this fails to happen.

It may be possible for cancer researchers to study tumor antigens the way scientists have examined antigens of normal tissues.

"If we can purify the antigens," said Dr. Paul Black, an MGH cancer investigator (May, *MGH News*), "and if, as seems likely, cell-mediated immune mechanisms are important in the ultimate rejection of cancer cells, maybe we could start immunizing a person with his own cancer antigen, initiating the production of antibodies which would lead to cancer rejection.

"It's just the opposite of what is being done with the surgical transplantation antigens. When we give a kidney to another person, we want to dampen the rejection reaction. Here, in cancer patients, we want to accentuate it."

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CUT ALONG DOTTED LINE

DO YOU KNOW THAT:

1. **The great majority of people hospitalized with heart attacks survive.**
2. **Those who do not survive often put off for many hours telephoning their physicians.**
3. **Survivors of heart attacks usually live for many years.**
4. **Most people who recover from heart attacks can work and lead normal lives.**

BUT:

If you are going to take advantage of lifesaving new techniques and your doctor's ability to help you lead a normal postattack life, you must let him know immediately when you are having symptoms of an attack. Know your warning signs, and if need arises, seek prompt professional opinion.

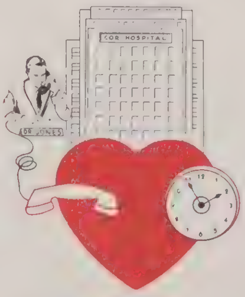
Column 1 will help you judge whether your warning signs warrant seeking professional advice. *Column 2* will help keep you from becoming unnecessarily concerned with signs unrelated to a heart attack:

May Be a Heart Attack If

- **Prolonged heavy pain under the breastbone lasting at least 5-10 minutes.** Pain is usually a severe, crushing one, but may be a slight one feeling like heartburn or indigestion.

  This may or may not be accompanied by sweating and profound weakness and rarely by real breathlessness.

  This chest pain may or may not spread, most often to the left arm, less frequently to the neck and jaws, and rarely to the back or abdomen.



Very Unlikely a Heart Attack If

- Sharp, shooting pains last no more than a very few seconds; nor if such pains are repetitive.
- Pain lasts only a very few minutes and comes with exercise or excitement and goes after stopping either. (May be a heart problem called angina pectoris. Doctor should definitely be consulted within 24 hours, but not on emergency basis.)
- Pain is aggravated each time you breathe.
- Pain is associated with tenderness. Painful area is tender to the touch.
- Pain is a numbness or tingling sensation in fingers and toes and is accompanied by lightheadedness. (This is probably due to nervousness.)
- Pain is increased by moving arms. (Is probably due to muscle strain.)
- What seemed like breathlessness is really:
  A feeling you can't take a deep breath.
  A feeling you can't swallow easily.
  (These are probably due to tension.)
- Heartbeat seems to skip. (Common and seldom a cause for worry.)

Should you have the first sign listed in Column 1 rather than the signs listed in Column 2, telephone immediately for medical advice. The sign may result from a cause such as indigestion but is serious enough to warrant immediate professional opinion. Chances that you are having a heart attack increase markedly if symptoms in Column 1 increase steadily, especially if they become intolerable.

MGH News

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MASSACHUSETTS GENERAL HOSPITAL, BOSTON, MASSACHUSETTS
December, 1970

Heart Surgery Without Violating Religious Faith

Thanks to a newly mended heart, five-year-old Terry Johnson is frolicking about with unaccustomed energy. Science made it possible for Terry to undergo open-heart surgery safely without violating his parents' religious faith. And the procedure devised for him shows at least some promise for others needing such surgery.

Terry first entered the Massachusetts General Hospital last April. Surgeons wanted to operate but needed permission to transfuse fresh blood in the likely event it was required after the open-heart operation. Because Terry's parents, Mr. and Mrs. Robert Johnson of Athol, Mass., are members of the Jehovah's Witness faith, they were unable to give permission for Terry to receive someone else's blood. Physicians at the MGH searched for some way to meet the religious requirements without endangering the boy's life.

Several years ago, the MGH had pioneered the technique of removing a patient's blood months before surgery, freezing it, and returning it after the operation. Would that be permissible for Terry? The Johnsons explained that removing the blood and storing it was also prohibited by their faith.

On the other hand, use of a heart-lung machine for open-heart surgery is allowed, because circulation between patient and machine is continuous during the procedure.

Dr. Denton Cooley, a Houston surgeon, has operated on members of the Jehovah's Witness faith without removing and saving their blood prior to using the heart-lung machine. Because of Terry's size and the amount

(Continued on Page 4)

From Curiosity about Plants to Helping Man

(Tenth of a Series on Basic Research)

It is a long way from the food manufacturing habits of bacteria to a practical treatment for a human disease.

Yet, two new cases give further indication that a pair of Harvard Medical School teaching hospitals have bridged the gap.

Three earlier patients have shown good long-term benefits from treatment. The two more recent ones have been treated over a shorter period.

One of these involves a 35-year-old woman who could not drive any distance on a sunny day without developing a severe skin reaction. Even 15 minutes in the fall sun caused her problems.

After treatment at the MGH, however, she spent two hours soaking up sun at the beach one hot day last September. She escaped even a sunburn.

The other new case involves a 10-year-old New Hampshire girl who never had been able to play outdoors. After similar treatment, she has romped about in the sun daily without problems since July.

Curiosity about plants and bacteria led Boston City Hospital and the MGH to use the medication which appears to control the disease that previously resisted any practical treatment. Their project followed the course from basic research to patient care.

The disease is a severe skin problem called erythropoietic protoporphyria. Victims must avoid even brief exposure to the midday sun or suffer consequences such as severe sunburn, skin rash, itching, and swollen skin.

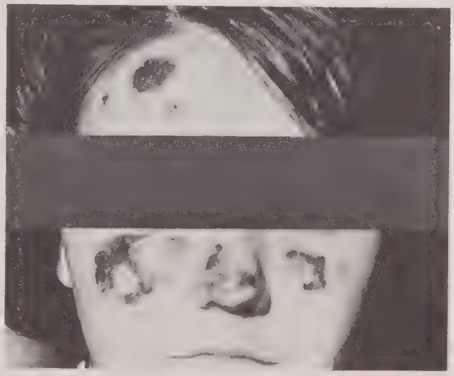
The medication is a substance that occurs naturally in many plants and bacteria. Called beta-carotene, it is also found in large amounts in foods like carrots and tomatoes.

Food faddists who eat large quantities of carrots, catsup and tomatoes find their skins becoming yellowish from an excess of carotenes. Persons whose thyroid glands fail to produce enough thyroid hormone, and about one in 10 diabetics, also develop the characteristic yellowish skin.

Two of the first five patients at MGH treated with beta-carotene were a 39-year-old policeman and his 10-year-old daughter. Since childhood, the policeman had experienced itching, burning and swelling of the skin from brief exposure to sunlight. He had always requested duties after sunset.

In June of 1969, he began taking the medication daily. Within a few weeks, he could tolerate several hours of sun exposure.

(Continued on Page 6)



Erythropoietic protoporphyria, a skin disease that for the first time appears to respond to treatment.

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EDITORIAL:

A Concern That Has Deepened

It was exactly one year ago that the *MGH News* began a series of articles on basic research. What prompted the series was a government reduction in research support in general and basic research in particular.

The *News* had pointed out in the December, 1969, issue how research aimed at satisfying the scientist's innate curiosity often leads to discoveries, new treatments or cures for the diseases of humans. Now the *News* concludes its series with a recent research project which clearly traces the road from curiosity virtually unrelated to medicine to a highly practical application. The page 1 story about a Boston City Hospital-Massachusetts General Hospital study already shows one practical application in medicine. Before the investigation concludes, it may lead to others. For that has been the history of basic research. One fundamental finding often generates an entire continent of useful ideas.

When the federal government began to slash research funds a year ago, many scientists agreed that a one-year cut would not prove critical. After all, basic research had been supplying ideas for many years, and these clues to practical application would continue to generate studies leading to new patient treatment. On the other hand, many investigators were concerned that the government's one-year cutback might develop into a long-term philosophy.

In the year since then, this concern has deepened. There seems to be developing a clearer philosophy in influential parts of Washington. Not only is basic research with its great well of ideas threatened; now even the practical research projects more directly translatable to patient care may be in jeopardy. The new philosophy seems to be saying, "We have enough research. We have to deliver health care. We need to get some of the physicians in research out of the laboratories and into the patient-care areas."

Nobody will argue with the need for more and better organized patient care. All the medical research since recorded history would look hollow unless applied to help mankind. What seems neglected in the new government attitude is the fact that delivery of health care will soon stagnate without improved means of preventing disease and of treating it when prevention fails. These are the very techniques which develop from both basic and applied research. The government deserves credit for emphasizing patient care, but this emphasis need not be at the expense of research.

Dr. Warren's Postmortem

The following excerpts are from Dr. John C. Warren's article about the MGH mummy. The article was written about 1824 for the Boston Journal of Philosophy and the Arts. *(See related story on page 8.)*

. . . The mummy presented by Mr. Van Lennep to the Massachusetts General Hospital was enclosed in a large deal box. On opening this, the outer coffin or sarcophagus appeared, as represented in the plate. [See picture, next page.] It is a wooden box, seven feet long, and of a breadth proportioned to the length, like the proportion of the human body.

The upper part of it is carved, in a very striking and peculiar style, to represent a human head; and, as it appears from the authors who have described the customs of the Egyptians, it was intended to be a likeness of the deceased person. The head is covered with a striped cloth or turban, on the upper part of which is painted a globe. The face has the character which has generally been considered as belonging to the Egyptians. The skin is of a reddish colour, the eyes black, nose broad, but not badly proportioned, mouth well formed. The face is broad and short; it has a very agreeable expression, approaching to a smile.

The shoulders are invested with a highly ornamented mantle, on the fore part of which the turban is seen depending. Below the mantle, in the middle, is seen the winged globe, by some considered as the sign for eternity: by others . . . the oldest representation of divine power . . . and it may therefore be believed to be significant of the immortality of the soul of the deceased, or else to be the symbol of divine protection.

. . . In the second compartment or tablet, below the globe, we have the representation of a most singular group, exhibiting the last judgment of the deceased and his reception by various divinities. . . . We notice four [sic] personages on the left, who are looking to the right and two persons on the right looking to the left. Behind the last of these, on the extreme right, is seen the balance, in the form of a cross, with a Cerberus as the evil genius sitting on its left and a hieroglyphic representation of the friendly divinity on the right.

. . . The figure next the balance without any other garment than a kirtle, is supposed to be that of the deceased, coming from judgment, under the protection of a divinity who has hold of his hand and seems to have taken him under his protection, in order to present him to the assembly of deities. At the head of these is the serpent, supposed by some to have been regarded as the good angel by the Egyptians. Next follows the great Osiris, the principal deity of the Egyptians, designated by his mitre, and staff or sceptre, the emblem of power; he has the attitude of receiving the new comer presented to him. After Osiris are seen four, or on the inner case five, other personages, bearing the heads of a dog, a baboon, a hawk, a wolf respectively, supposed to be representations of important divinities. . . .

. . . This mummy is about five feet long, heavy, and solid to the touch. A single cloth of a yellowish colour enveloped the whole body from head to foot, being confined closely and neatly to the body by a number of transverse bands of a white colour, under which lay the reliques of corresponding dark coloured bands, so much decayed as to crumble to atoms on being touched. The dark bands were broader than the white, so as to exhibit their edges and produce an ornamental effect; but the colouring substances had caused them to decay, while the others remained entire.

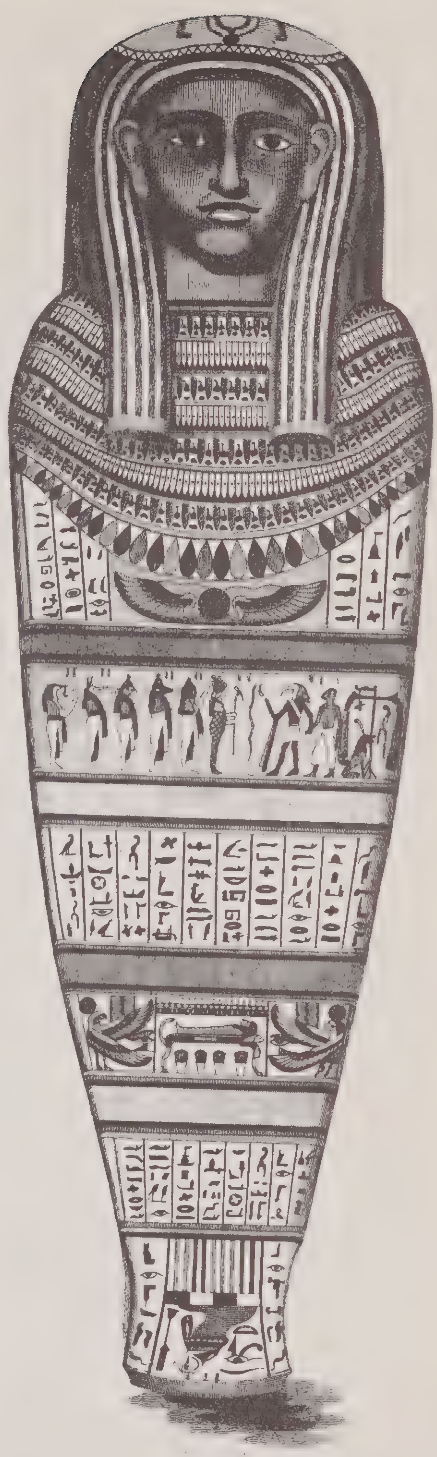
At the feet lay a large heap of beads, composed of green and yellow porcelain, partly connected by threads, whose decay had caused the network to fall in pieces. A green network like this is seen covering the bodies of Osiris, in Plate I [picture, this page], and the winged Isis on the inner case; and there is no doubt it was intended to invest the whole of the body for some religious purpose. As the beads could not be shown in their disconnected state, they have been put together and placed on the mummy, though not in the original form, but as well as circumstances permitted. Some of the beads are still very firm, others crumble on a slight pressure.

In order to examine the state of the body, I cut through the external cloth, where it covered the head, and found a great many turns of bandages about three inches wide, rolled around, to the number of twenty-five thicknesses. The outer cloth and the outer turns of bandages were in fine preservation and of considerable strength. They exhibited marks of having been imbued with some glutinous substances, intended to preserve them; and to which is to be attributed the yellow colour. The inner turns were more decayed as they were nearer to the body; those next it were quite rotten, and so closely cemented to the surface as to be separated only by a laborious process.

The cementing substance is asphaltos, the same in which the body is embalmed. This substance was quite dry, hard, and brittle. Imbedded in it, on the nose, was found a beetle, and near this another small insect, whose character could not be determined. The beetle was a sacred animal, in high estimation among the Egyptians . . . and has been supposed to be the symbol of fecundity.

The skin of the face being exposed, was dry, hard, of a black colour, and its texture readily distinguishable, although deeply imbued with the embalming bitumen. It was wrinkled as if it had been exposed to the action of great heat, or pressure while in a soft and yielding state; and the latter cause has produced a distortion of the features, from the right to the left side. The sockets of the eyes are filled up, the eyelids preserved; but the eyebrows, together with the other hair, is removed or destroyed near to the head, probably by the action of heat; just enough of it remaining however to show that it was not black nor crisped or woolly, but of a brown or reddish brown colour. The teeth are perfect, so far as they can be seen; quite white, and shaped like those of the European, contrary to the opinion of some learned men that the Egyptians had the incisor teeth pointed like the canine or dog teeth.

The ears are small and well filled with embalming substance. The skin of the scalp has the same appearances as that of the face. Being unwilling to disturb the coverings of cloth and bandage, I left every thing on the body in the same state as it issued from the sepulchre of Thebes. The bandages about the neck were afterwards cemented together, to prevent the air from entering, and the head of the mummy was invested with a cloth formed into something like those represented on the heads of the cases, instead of the turns of bandage which had originally enveloped it.



A woodcut of the outer of the two mummy cases. (It is the inner one which is on display in the Ether Dome.) This plate appeared in the article Dr. John C. Warren wrote for the *Boston Journal of Philosophy and the Arts*, about 1824.

Every part examined was deeply impregnated with the embalming substance which proved, on examination, to be asphaltos, the bitumen of Judea.*

---

*(Asphaltos is a black, inflammable, bituminous substance, like pitch; chiefly found floating on the surface of the Dead Sea, or Lacus Asphaltites, in Judea, on the spot where stood anciently the cities of Sodom and Gomorrah.)

Heart Surgery Without Violating Religious Faith

(Continued from Page 1)

of fluid required to fill the device, his red blood cells would have been thinned down so much after the operation that he would have been in danger of not carrying enough oxygen to his vital organs. Furthermore, the complexity of Terry's heart disease requires a longer period of time on the heart-lung machine, and this makes him less able to clot from bleeding sites when no longer dependent on the external circuit. Both the reduction in the number of red cells and the ability to clot made it desirable to evolve a method by which his blood could be preserved for a brief period without being disconnected from the body and returned.

Another Problem

MGH researchers had previously performed nearly 75 operations on animals using a salt solution (Ringer's lactate) instead of blood in the heart-lung machine. The results showed that the animals required no additional blood beyond that coming from their own circulation. Included with the salt water are sugar and proteins such as albumin. But the Jehovah's Witness faith forbids the injection of any animal products into a member of the faith, and proteins are technically animal products.

This tenet presented still another problem. During the operation itself, the proteins and other animal products would not prove essential. However, the heart-lung machine tends to damage both the proteins and platelets in blood, and these would be needed again after surgery. Both are involved in the clotting of blood. With damaged clotting factors, otherwise healthy people would bleed to death. This is a major reason patients often require transfusions after open-heart surgery.

Since Terry's operation was considered likely to be followed by marked bleeding, the loss of clotting factors during surgery could have proved fatal unless made up for by undamaged platelets after the operation. Fresh blood with undamaged platelets and protein was, therefore, in order.

All these facts had convinced the physicians that Terry would require postsurgical transfusions. But how could they make the requirements of medicine conform with those of religion?

Dr. Myron B. Laver, MGH anesthetist, had found in earlier laboratory experiments that under controlled conditions it was possible to remove just about all of an animal's blood and replace it with salt solution without upsetting the function of major organs – as long as the red cells were returned to the circulation before the animals were allowed to wake up. The same approach was planned for Terry's surgery.

Blood Flows Back

Even though removal came just before the operation, it would not comply with the religious tenet about shedding blood. Dr. Laver devised an alternate technique. The required amount of blood would be drained from an artery in the arm after Terry had been put to sleep for the operation, but before he had been placed on the heart-lung machine. Instead of being completely removed, however, it would pass into three blood-storage bags, all of which would remain connected to the arm.

Once repair of the heart was complete and the heart-lung machine shut off, the surgical team would let the blood flow back into Terry's arm. Undamaged by the heart-lung machine, his own blood-clotting factors would meet his postoperative needs.

Four Problems

Terry's parents agreed that the procedure – like the heart-lung machine itself – would conform to their religious tenets.

On October 1, Dr. Mortimer J. Buckley, Jr., an MGH heart surgeon who specializes in correcting congenital disorders (those appearing at birth), led a surgical team including Dr. Laver.

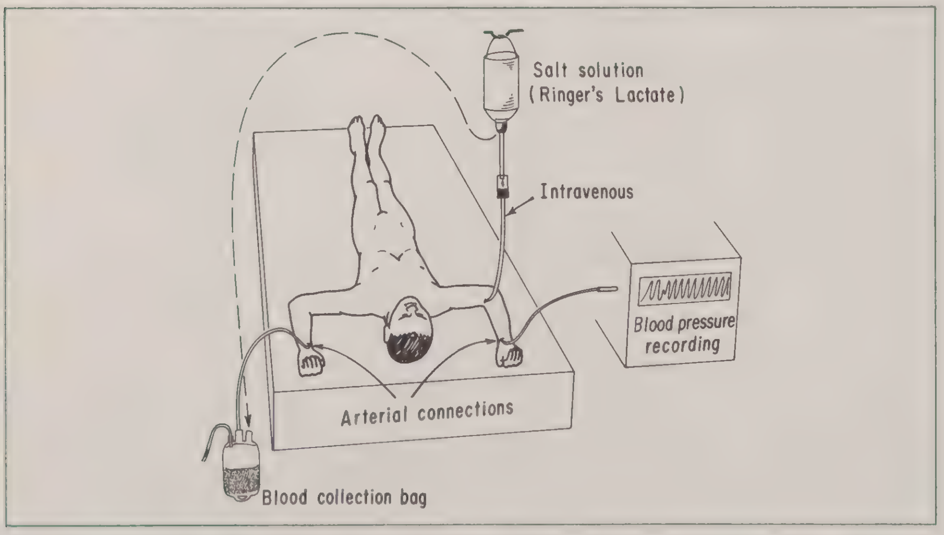
The disorder that had to be corrected is a fairly common one called tetralogy of Fallot. Tetralogy actually refers to four problems.

Two of these are major. One is a hole between the two lower heart chambers (ventricular septal defect). This hole was allowing blood which had not received oxygen from the lungs to flow from the right side of his heart to the left. From there the dark, unoxygenated blood would be pumped by the heart into the body, giving it the bluish appearance characteristic of "blue babies." As a result of insufficient oxygen-rich blood, Terry tired easily.

Enlarged Chamber

The second major problem he suffered from was muscle overgrowth (infundibular pulmonic stenosis) in the right lower heart. By obstructing the flow to the artery (pulmonary) that delivers blood to the lungs for a fresh new supply of oxygen, the second condition was restricting the rate at which blood was reaching the lungs for oxygenation. That slowdown added to the other problem.

The remaining two disorders resulted from the major ones. Because Terry's abnormal heart had to work harder, the right lower chamber enlarged. Another result was that the aorta, the main



Drawing shows setup like the one devised for Terry Johnson's operation. In Terry's case, three collection bags were used to store his blood and remain connected to his arm. The stored blood was allowed to flow back into his arm after repair of his heart and the shutting off of the heart-lung machine.

artery leading from the heart, originated slightly to the right.

Those two minor conditions require no surgical treatment. Correcting the major problems would in the long run adjust the minor ones.

Dr. Laver had determined the exact amount of Terry's blood to be let into storage bags just before the operation. Taking into account Terry's size, condition, age, and operative needs, he decided to let 1,200 milliliters or 2½ pints flow into the three reservoirs.

Safe Procedure

The percentage of red blood cells in his whole blood (hematocrit) luckily was unusually high. Taking this into account, Dr. Laver was able to use a relatively large amount of salt solution to replace the volume of blood temporarily removed from inside the body itself. (See accompanying story.)

The animal experiments and similar use of a salt solution in other patients at other hospitals showed that this could be a safe procedure. Diluting the blood this way for surgery is not new. Diluting it for a procedure requiring as much blood as a total correction of a tetralogy of Fallot may be.

With the heart-lung machine turned on, the salt solution began to flow into the machine and mix with Terry's blood which circulated through the machine and his body, bypassing his heart and lungs.

By taking over the functions of the heart and lungs, the machine allows the surgeon to stop the heart and make it bloodless. The surgical team took extraordinary precautions to block every bleeding point in the heart.

Sewed in Patch

An examination of the heart confirmed what the presurgical diagnostic procedure had disclosed. Terry had a typical hole about the size of a quarter between the two lower chambers.

Dr. Buckley sewed in a patch of Teflon to cover the hole. He also cleared the pulmonary artery area of the excessive muscle that was obstructing blood flow. The procedure took a little more than an hour.

The heart-lung machine shut off, the surgical team allowed Terry's blood to flow back from the reserve bags.

The red cell to total whole blood ratio became normal. The fresh platelets in his reserve blood supply boosted his number of platelets to normal. The time required for his blood to clot also returned to normal.

TERRY JOHNSON

As a result of the great pains to avoid bleeding during the surgery and the return to normal clotting time after, Terry experienced none of the bleeding problems that may complicate recovery from such surgery.

About 90 percent of children survive such operations and do quite well. The other 10 percent usually run into lung complications right after surgery.

For children with Terry's former condition, the major problems of tetralogy reduce the amount of blood their small lungs must fill with oxygen. From birth the lungs are accustomed to the less-than-normal blood flow.

Full Brunt

But the moment the operating team turns off the heart-lung machine, this lifelong condition abruptly changes. A normal and, therefore, a much increased flow of blood rushes into the lungs.

"You now subject the circulation in the lung," Dr. Laver said, "to the full brunt of this flow. Very often the circulation is not prepared for this large flow and bleeding into the lungs may ensue. This is accompanied by difficulties with respiration, a source of much anguish after the operation and the primary cause of death in these children."

So sudden is the assault to the lungs that the anesthetist usually has some idea of the patient's chances within 24 hours after surgery. With Terry there was almost no question. He surprised his physicians by his remarkable recovery and asked for tomato soup for lunch the next day.

In addition to the unusual surgical treatment, Dr. Laver attributes this recovery to Terry's condition which was at the perfect stage for the operation. The youngster returned home on October 16.

His mother described the difference in his preoperative and postoperative condition:

"Before he used to get tired out by the time he got to the top of the stairs. Now it takes all my time to keep him from running around." Mr. Johnson added: "Already he doesn't puff and blow like a fat man."

Only 15 Years

Dr. Oscar Starobin of Worcester Memorial Hospital had recommended Terry for surgery at the MGH. Terry told his parents he wanted to be able to run about with his 12-year-old brother, Robert, and his 11-year-old sister, Diane.

Chances are that without the surgery Terry would not have lived beyond his teens. Already diminishing, his stamina would probably have declined severely.

Physicians have had only 15 years to study the results of operations for total correction of tetralogy of Fallot.

Based on this limited period, however, Dr. Allan Goldblatt, Terry's MGH heart specialist, thinks the boy's heart should serve him well for normal activities in the coming years.

The operating team was so pleased by Terry's failure to develop post-surgical bleeding complications that they have since applied the same blood management to two other children – neither of the Jehovah's Witness faith. Both have recovered without complications from operations similar to Terry's.

Physicians are evaluating the potential of the procedure with an eye to possible increased use.

(Related Story on Page 7, Col. 3)

From Curiosity about Plants to Helping Man

(Continued from Page 1)

By the middle of the summer, he began working the day shift. He made no attempt to avoid the sun and wore a short-sleeved uniform shirt. His skin no longer itched, burned, turned red or swelled.

For seven years, his daughter experienced the same severe symptoms. She was unable to go out in the sun for as much as 15 minutes at midday. After treatment, she played freely at the beach with other children, without having to worry about ill effects from the sun.

Works Outdoors

The third patient, a 33-year-old man, used to experience the same symptoms as the other two, after 15 to 20 minutes in the sun, and had to avoid going outdoors except at night or while the sun was very low. He now can work outdoors in the afternoon without discomfort.

The Boston City Hospital-Massachusetts General Hospital research had its origins at New York University School of Medicine. There Dr. William Sistrom was doing research on the pigments of bacteria.

As a postdoctoral student at the University of California at Berkeley, he had found that bacteria which use light to manufacture food (photosynthetic bacteria) are protected from a deadly dose of light by the carotene normally present in them. The same observations had been made elsewhere in higher plant life.

'Why Not on People?'

Dr. Micheline M. Mathews-Roth took a year from her studies at New York University School of Medicine to pursue further experiments with Dr. Sistrom. They investigated carotene pigments of nonphotosynthetic bacteria and showed that in these bacteria also the carotene pigments normally present could protect them from a deadly dose of light.

"When I returned to medical school," Dr. Mathews-Roth recalls, "I learned about photosensitive [light-sensitive] diseases in people. I wondered why, if carotene works on bacteria, why not on people?"

First the idea had to be tested in lower animals. In her senior year at NYU medical school, Dr. Mathews-Roth, whose interest in science stemmed from preparing her prize-winning entries in *The Boston Globe* science fair, worked with Dr. Leonard Harber of the medical school to develop an animal system for testing.

Ready for Trials

After medical school graduation, a postdoctoral fellowship and internship, she went to the Channing Laboratory of Boston City Hospital and continued her work under Dr. Edward H. Kass, its director. Dr. Kass's group has long been interested in seeking, in bacteria, clues that could be applied to humans. Dr. Mathews-Roth made mice sensitive to light by injecting them with a substance called hematoporphyrin.

Some of these light-sensitive mice were then treated with beta-carotene before exposure to light. Three times as many treated mice survived lethal doses of light as did untreated ones. Now beta-carotene was ready for human trials.

First Three Patients

"Because of the reputation of the Dermatology Department at Massachusetts General Hospital in treating people with photosensitivity, I turned there," Dr. Mathews-Roth said. Dr. Thomas B. Fitzpatrick, Chief of the MGH department, called in Dr. Madhu A. Pathak, Chief of the department's Photobiology Unit.

Dr. Pathak then began treating with beta-carotene the first three patients who volunteered. He regulated the doses and collected scientific data on their progress.

The researchers felt confident that beta-carotene was safe because pharmacologists had had long experience with it as the substance from which vitamin A is formed.

"Beta-carotene is virtually free of possible harmful side effects," Dr. Fitzpatrick said. The Boston City Hospital-MGH group obtained its supply from a drug firm, and with continuing research the medication may later be marketed.

A Rare Disease

Results with the first three patients were published May 28 in the *New England Journal of Medicine.* All five patients treated so far at the MGH have erythropoietic protoporphyria, a rare disease. The Boston City Hospital-MGH group is anxious to try beta-carotene in alleviating photosensitivity reactions in other forms of porphyria that are common in the United States.

Studies similar to the one at the MGH are also being carried out in collaboration with Dr. Harber in New York.

Dr. Pathak hypothesized about the effect of the medication.

"Beta-carotene works on patients sensitive to a narrow bank of sunlight in the range of 4,000 angstrom units.

Dr. Micheline M. Mathews-Roth with culture of bacterium *(Sarcina ludea).* Her curiosity about this bacterium was a key step toward development of an important new medication.

We don't know how and why it works, but we think it acts as a screen."

Visible Violet

The 4,000 angstrom range of sunlight to which porphyria patients are susceptible is visible violet light. Unlike ultraviolet light which is invisible and causes sunburn, this violet light passes through glass and affects porphyria patients sitting in a car or behind a window of their home. This violet light is harmless to normal individuals.

Last year, the MGH group announced the development of a lotion which protects, more effectively than any previously used, against ultraviolet light, the cause of sunburn. But that lotion has no effect on porphyria.

Dr. Fitzpatrick said his department is hoping to develop an oral agent that will prove as effective against sunburn as beta-carotene seems to be against erythropoietic protoporphyria.

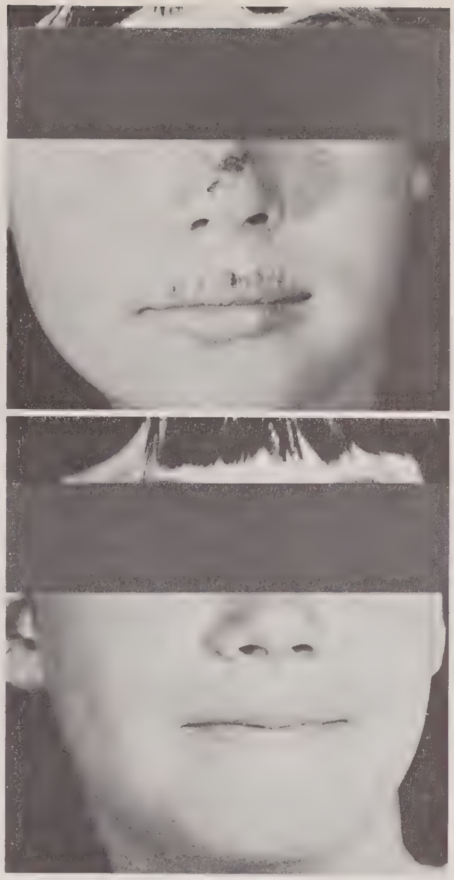
Led to Advances

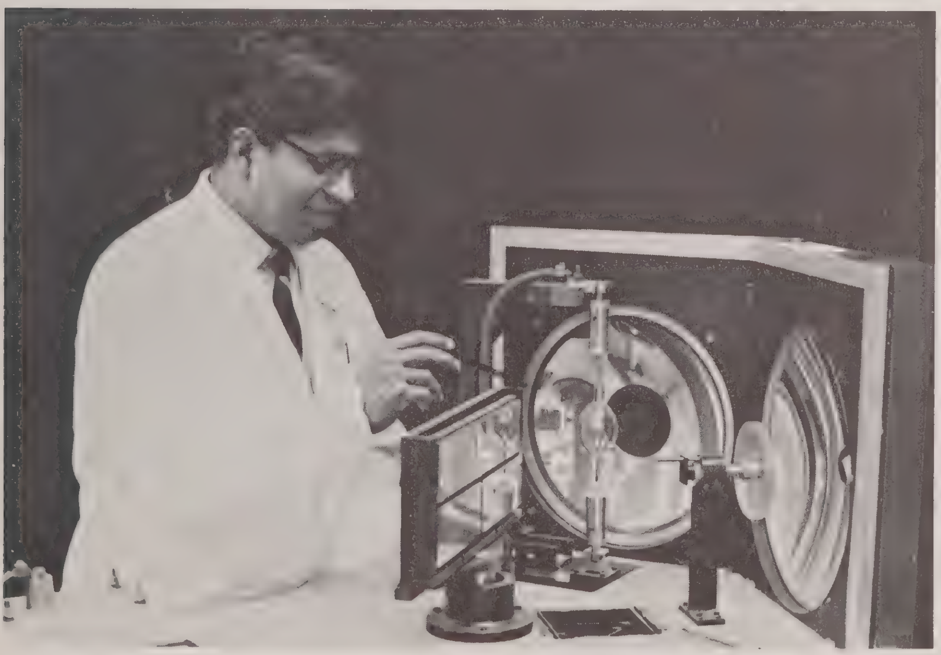
Dr. Mathews-Roth was principal author of the article that appeared in the *New England Journal of Medicine*. She is an Associate in Bacteriology at Harvard Medical School.

Dr. Pathak is an Assistant Professor of Dermatology at Harvard Medical School, where Dr. Fitzpatrick is Edward Wigglesworth Professor of Dermatology, and Dr. Kass is Associate Professor of Medicine. Dr. Harber is Professor of Dermatology at New York University School of Medicine.

Their work has been aided by grants from the National Institutes of Health. Dr. Kass described the research project as an example of how curiosity about basic science unrelated to patient care can lead directly to advances in treatment.

(Last of Series)


Young girl before and after new treatment for a mild outbreak of a severe skin disease called erythropoietic protoporphyria.


Dr. Madhu A. Pathak adjusts a monochromator, a device he uses to test the patient's sensitivity to different frequencies of light.

Norway's Ice Fish Teaches a Lesson

A fish which swims in deep Norwegian waters is a living example of a principle which helped make Terry Johnson's operation possible. (See page 1 story.)

The so-called ice fish confounds those who believe that animal life cannot exist without red cells. Instead of red cells containing vital oxygen, the ice fish harbors clear fluid in its blood.

Secret of Survival

The secret of its survival is its ability to float motionless, its huge mouth open to trap food particles. Since the ice fish expends little or no energy with muscle work, it apparently needs no red cells to carry oxygen vital to the energy-giving process.

The same principle may apply to humans at rest. Paralyzed by anesthesia, the patient on the operating table probably requires very few red cells to carry oxygen since his muscles remain at rest. He does, however, need to maintain his blood volume. Diluting the blood with salt solutions maintains the volume while whole blood is stored outside the body to prevent damage to the clotting factors.

Not New

This concept, called "hemodilution," is not new. In adapting it to the clinical situation, Dr. Myron B. Laver, MGH anesthetist, had to decide on the amount of dilution that would be safe for Terry.

A heavy person tends to have more blood than a lighter one. The average sized adult holds from 10 to 12 pints of whole blood (red cells plus plasma) in his blood vessels. Terry, who weighs about a third as much as the average adult, has 3½ or 4 pints.

More Than Half

For an adult, removing 2½ pints during surgery and replacing it with a salt water solution would not prove much. But 2½ pints, the amount temporarily removed and replaced in Terry, represents more than half his blood.

Doctors knew his blood was so high in red cells that he could tolerate this temporary dilution while he was anesthetized.

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Historic Gift Made Unique Fund-Raiser

One of the earliest fund-raisers for the MGH is still around. He is rather old, and no one pays much attention to him these days.

But he has seen the hospital grow, and witnessed many of its pioneering medical developments, including Morton's first public demonstration of ether in a surgical operation. More recently he has been in attendance at significant medical meetings.

His name is Paddy Hershef, and he resides in the historic Ether Dome. He is a mummy from ancient Egypt's Thebes.

A gift of Dutch merchant Jacob Van Lennep of Smyrna, the mummy was delivered to the MGH on May 4, 1823, by Mr. Van Lennep's agents, Byrant P. Tilden, Esq., and Capt. Robert B. Edes.

Mr. Van Lennep, who was the Consul General of The Netherlands, had requested the British consul in Alexandria to procure a mummy, and that gentleman wrote that "having found no good ones, opened, in [Alexandria] or Cairo, commissioned a person going to Thebes to select one, and he succeeded in procuring the best that had been seen in a long time."

Mr. Van Lennep sent the mummy to Boston "to be given to some public establishment as a mark of respect to that city."

Mr. Tilden and Capt. Edes, who took charge of the mummy upon its arrival in this country, "thought they should best accomplish the intentions of Mr. Van Lennep by presenting it to the Massachusetts General Hospital in order to aid the funds of this charitable institution."

Dr. John C. Warren, MGH's first surgeon and co-founder, was requested "to open the cases, and examine their contents." He afterward wrote a description of his examination for the *Boston Journal of Philosophy and the Arts.* (See page 2 story.)

The mummy did visit other cities. The Trustees voted in October, 1823, to lease it for exhibition for one year. In that first year Paddy Hershef raised a gross of about $1,500.

The mummy reportedly left the hospital in 1879 to be deposited in the Art Museum of Boston (now the Museum of Fine Arts) "for safekeeping." No one seems to know when Paddy returned, but since about 1900, he has remained in the Ether Dome.

Many years after Paddy's initial examination by Dr. Warren, he received a more modern one about 1931 from Dr. Edward D. Churchill, later Chief of Surgery until 1962, and now Honorary Surgeon. Careful not to disturb the wrappings, Dr. Churchill X-rayed the mummy in search of the cause of death. The pictures yielded no clue.

Later other X rays were made, which in the process caused the present disarray of the gentleman's linen.

Until 1960, no one knew much of Paddy Hershef's circumstances in Egypt, or even that he was Paddy Hershef. Dows Dunham, Curator Emeritus of the Department of Egyptian Art at the Museum of Fine Arts, examined the mummy at the request of Miss Helen Sherwin, Coordinator of Science Instruction and Psychiatric Nursing for the School of Nursing. His report has until now been unpublished.

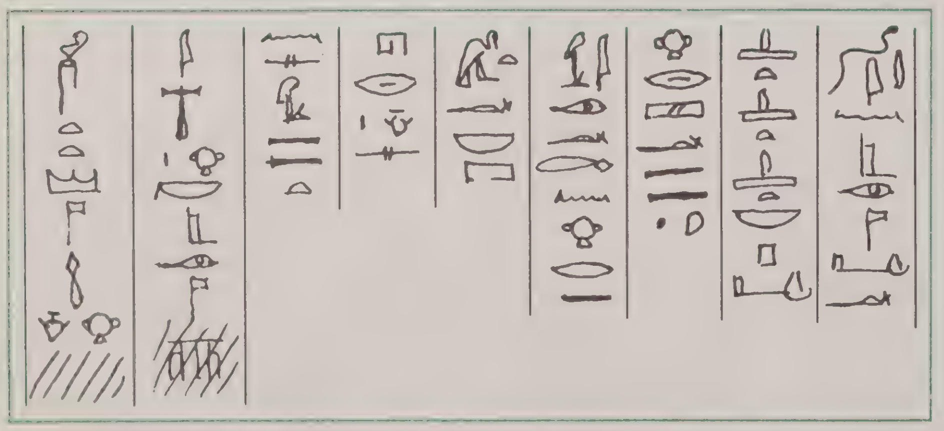
Mr. Dunham determined by the style of decoration and type of names on the sarcophagus that the mummy was most likely from the 26th Dynasty (663-525 B.C.) or somewhat later. Unfortunately no titles or rank accompany the personal names, so "we cannot tell what sort of man this was, nor what his occupation was."

From right to left, Mr. Dunham's translation of the uppermost set of hieroglyphics reads:

"Spoken by Osiris: He gives all food-offerings for Paddy Hershef, deceased, son of Iref-a-en-her; his mother, the Lady Her-ibes-enes, deceased. Greetings to thee Osiris [foremost] of the West, great god in the midst of ___."

Paddy Hershef is the embalmed gentleman's name, which means "gift of the god Hershef." Iref-a-en-her is his father. Her-ibes-enes is his mother's name, meaning loosely, "She is satisfied with her."

At the bottom of the two left-hand columns, two words are obliterated. The first, "foremost," is part of a known expression. The last, Mr. Dunham said, cannot be restored.



A sketch of the hieroglyphics on the inner case enclosing Paddy Hershef. The embalmed man's name was learned from Dows Dunham's translation, never before published.

MGH
News

Vol. 30 No. 1 MASSACHUSETTS GENERAL HOSPITAL, BOSTON, MASSACHUSETTS January, 1971

A Shambles Before; A Mountain Climber Again

MIT Professor Alan L. McWhorter spent part of last summer mountain climbing. He had spent part of the preceding year in the MGH hovering close to death.

At 11 p.m. on March 29, 1969, the clock nearly stopped permanently for the director of the Solid State Division of MIT's Lincoln Laboratory. That was the moment a two-car, head-on collision on Route 2 in Arlington reduced his 38-year-old body to shambles.

At a nearby community hospital, a physician shook his head as he examined the unconscious form. The chances of saving the professor's life seemed slim. The possibility of ever restoring him to anything approaching a normal life appeared too remote to consider at that moment.

In any event, only a hospital equipped to handle a wide range of complicated problems could accept such a challenge.

Two hours later a team of residents and interns huddled over Professor McWhorter in a small room inside the MGH Emergency Ward. What they – and the X rays – saw was to challenge a battery of some of the world's most skilled medical experts over the next four months.

First, bones starting at the skull and ending with his lower leg were fractured. Some, like his nose and most of his other facial bones including his upper jaw, sustained crushing (comminuted) types of breaks. Both bones of his right lower leg and both of his left forearm suffered compound, crushing fractures. His left hip and shoulder were dislocated as well as broken.

The fracture of the skull was simple,

(Continued on Page 8)

"Specialization and the Resulting Expertise"

Professor Alan L. McWhorter's four months at the MGH (other page 1 story) illumine some of the benefits – and some of the drawbacks – of a teaching hospital.

What are teaching hospitals? One definition classifies them as major and minor.

A major teaching hospital is one which, like the MGH, is used extensively for the clinical (patient) instruction of medical school students. A minor teaching hospital is used for only a limited amount of student instruction, such as occasional demonstrations or clinics.

Traditionally, teaching hospitals are places where a medical school graduate seeks further training. He almost always undergoes one year of hospital training as an intern. He may, and usually does, train two or more additional years in a hospital as a resident in some specialty, such as internal medicine, surgery or anesthesia.

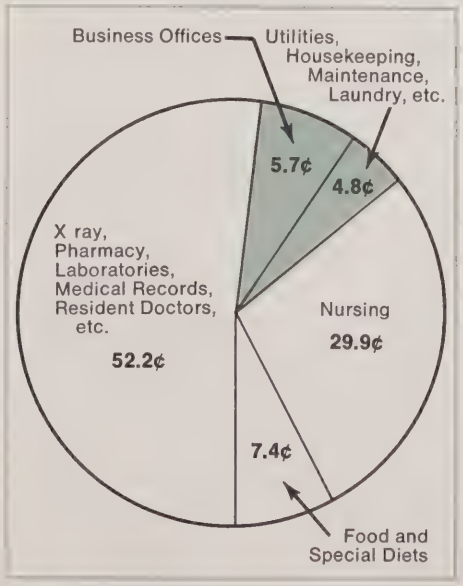
With some exceptions medical school students learn in teaching hospitals rather than community hospitals. (They cannot prescribe medicine or in any way treat patients.) On the other hand, some community hospitals maintain intern and residency programs. When these exist, however, they tend to be far less complete than in the teaching institution.

Numerically, teaching hospitals represent fewer than 450 of the nation's 7,000 hospitals. However, they care for a little over one of every five hospitalized Americans.

"In one respect," said MGH General Director Dr. John H. Knowles, "the difference between a teaching hospital and a nonteaching hospital is largely the difference between an urban and a rural hospital, because most urban hospitals are large, adjacent to universities, and exist where the population density is the highest.

"Automatically they provide a wider variety of services that they are called upon to give to a much larger population than a rural or even suburban hospital. . . . Because teaching hospitals develop a wide range of expert service, community hospitals send us their patients with more complex illnesses, or those who started with common diseases and have developed complications."

(Continued on Page 2)



The pie shows how the patient's dollar was spent for inpatient care in the fiscal year which ended September 30. The colored portion is comparable to hotel costs.

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EDITORIAL:

An Understandable Lack of Understanding

In October the federal government's General Accounting Office filed a report that criticized some of the Medicare accounting practices of the MGH. That report left some serious questions about whether the GAO fully understands the functions of a teaching hospital. For the criticisms made in that report were basically ones that could have been applied to many such institutions.

The lack of understanding was particularly evident in regard to ward "visits." On the wards of a teaching hospital, staff doctors retain overall responsibility for the patient's care. On the other hand, the residents and interns perform most of the detailed tasks required for that care.

The residents admit the patient and take his case history. Each day a member of the hospital's senior staff visits a given ward, examines the new patient and goes over the course of treatment planned by the resident. Unless he disagrees with the proposal, the staff doctor allows the resident to carry out the plan. The staff physician may spend little or much time with the patient on subsequent visits. If the patient has a very complex and serious illness, the doctor's involvement is great. Should the disease prove less complicated and the resident's management of it proper, the staff doctor or "visit," as he is called, may confine his supervision to a review of the patient's daily medical record.

The GAO report noted that at the MGH although the visiting physician did not always write into the medical records, at the very least he always discussed each patient with residents and interns and carefully examined all new patients. In drawing conclusions, however, the report inconsistently implied that the absence of entries meant that the visiting physician was not providing any care to patients for whom Medicare was paying that physician. Such an implication seems completely out of touch with reality.

The pattern of a teaching hospital ward was established scores of years ago. Its purpose is to provide the best care for the patient while affording a learning experience for the young physician or medical student. Into that pattern have been built a number of safeguards. We do not believe that the teaching hospital, any more than the community hospital, is perfect. But when considered as a whole, we believe the system results in quality care for the patient at the same time it trains fine physicians for the country.

The *News,* however, understands the confusion and recognizes its obligation to the public to contribute knowledge of a very complicated type of institution. With that in mind, this issue is devoted entirely to the teaching hospital. While many of the examples used relate to the hospital with which we are most familiar, the conclusions apply to teaching hospitals in general.

Expertise Resulting From Specialization

(Continued from Page 1)

What this has meant at the MGH, for example, is the development of 10 different intensive care units, in six separate medical specialties, as well as expertise throughout the hospital in a wide variety of diseases. Every teaching hospital can similarly point to areas in which it has become particularly qualified.

Even specialists, however, are known to perform their duties much better when they do them frequently, rather than occasionally.

"Open-heart surgery and deep radiation treatment for cancer are two areas where studies have shown that results are much better in hospitals that get a number of such cases," said Dr. Ellsworth T. Neumann, MGH Administrator. "For the most part it is the teaching hospital that sees those problems with frequency."

Specialization and the resulting expertise cut across the entire spectrum of medical care in a teaching hospital. Nurses, therapists, dietitians, technicians and nonprofessionals such as repairmen learn skills in specialized areas.

Along with increasing specialization of personnel, the equipment in a teaching hospital grows equally complicated. The Respiratory Unit, where Professor McWhorter spent some of his sickest days, backs its skilled staff with such assorted equipment as computers and monitors.

Much the same can be said for many other areas of the MGH and most other teaching hospitals.

Often the teaching hospital specialist finds that increasing complexity of technology and proliferating files of information force him to develop a subspecialty or even a sub-subspecialty.

Thus, while the entire bone structure is the orthopedist's province, the MGH has one expert who devotes his time to highly complicated hip surgery.

About seven years ago the pressure of technology and patients forced an ear, nose and throat specialist at one New England hospital to limit his practice to stapedectomies – an operation involving only the tiniest bone in the human body.

By necessity, expertise also leads teach-

NEXT MONTH:

The Future
Of The
Teaching Hospital

ing hospitals to the team approach of medicine. No *one* physician could possibly have cared for Professor McWhorter.

Without experts in a number of fields and without a generalist to coordinate the experts, he would have died of any one of several causes. The assemblage of experts is more than the sum of its parts.

"There is a constant peer review in the teaching hospital that until recently was seldom found to a significant degree in the community hospital," said Dr. Daniel S. Ellis, veteran MGH internist and Harvard Medical School faculty member.

A vital part of the review comes from residents, interns and medical students. Once confined to the wards (areas with patients lacking private physicians) of teaching hospitals, these students and postgraduate MDs now see private patients in many teaching hospitals.

Medicare, which has slowly eroded the traditional ward, encouraged this trend, and a need to provide an increasing part of the medical school training in the hospital has further stimulated it.

"It is an enormous stimulus to every physician to have young inquisitive people around him," said Dr. W. Gerald Austen, Chief of Surgical Services at the MGH.

"Whether they are Harvard Medical School students, or interns and residents, they are bright and alert, and they want to know everything. They keep everyone on his toes. This makes everyone more knowledgeable and results in an atmosphere that attracts many of the best people to spend their lives here."

Dr. Austen noted that the MGH this year obtained all of its first choices of medical school graduates from around the country in filling 14 surgical internship slots.

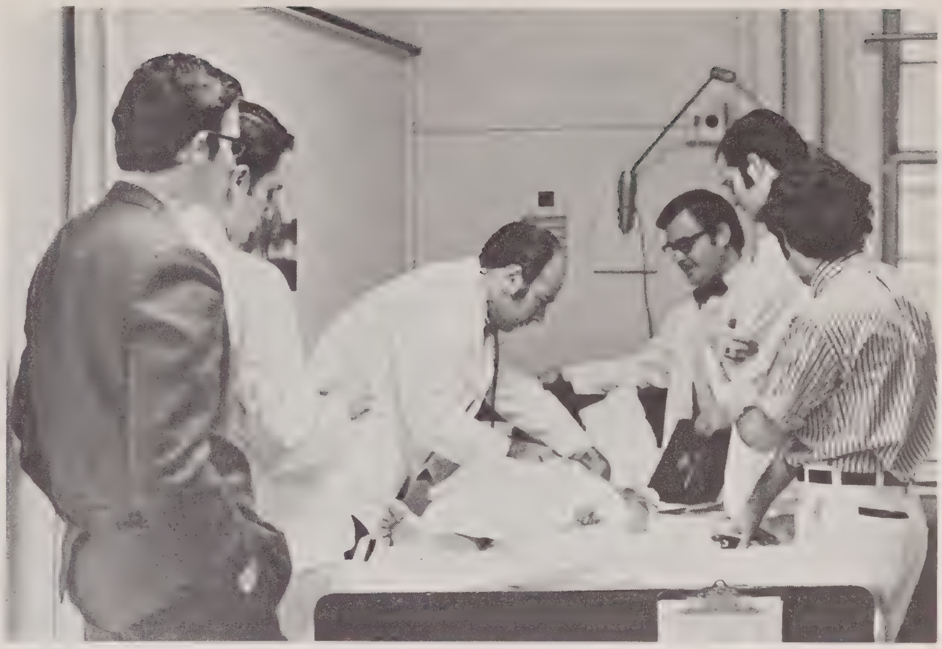
Dr. Alexander Leaf, Chief of the MGH Medical Services, said that at the MGH the ratio of interns and residents is now almost as great on the private services as on the wards:

"Now, at Harvard Medical School, the volume of teaching is shifting from the school to the hospitals. The student is involved with patients all four years instead of just the third and fourth.

"The patient on the private service as well as the ward seems to enjoy someone else coming in and consulting about what can be done to aid in his care.

"It's really remarkable. Few patients will grumble. Many heads are brought together on the problems of the patient – the private physician, the resident, the intern and the medical student. The fact that there is teaching makes the potential quality of patient care unmatchable."

The spread of the teaching load throughout the hospital follows a plea made at a Lowell Lecture three years ago. Dean Robert H. Ebert of Harvard Medical School, then Chief of Medical Services at the MGH, said:



Many heads are brought together on the problems of the patient. Dr. Daniel D. Federman conducting a ward visit with a team of residents, interns and medical students.

"The fact is that care on teaching wards is as good as the care on private divisions, and in some instances far better. . . . It is clear that private patients must be used for teaching if medical schools are to survive. It is equally clear that this entails no sacrifice in the quality of care; indeed it insures better care."

Besides the checks and balances offered by the interchange between student, intern, resident and regular staff, the teaching institution offers another vital advantage to the patient.

"Practically speaking," Dr. Austen explained, "even the most conscientious doctor can only be in the hospital 12 to 14 hours a day. The teaching hospital has strong resident and internship programs which provide 24-hour coverage."

When Professor McWhorter arrived at the MGH Emergency Ward, skilled residents and interns were on hand to take the vital first emergency measures.

Many times in the course of a month residents provide emergency care to private and ward patients late at night. In one recent case at the MGH, a patient began massive internal bleeding early one morning. With his private surgeon at home, residents had five minutes to get him to the surgical suite and operate themselves. They were in time to save his life.

Along a similar vein, Dr. Mitchell T. Rabkin, General Director of Boston's Beth Israel Hospital, wrote in a guest editorial in the November, 1970, issue of *Medical Counterpoint:*

"Indeed, the sickest of today's patients is often so carefully monitored by our advanced technology that critical professional decisions may be called for on virtually a moment-to-moment basis. Without the presence of full-time staff physicians and house officers, the patient's need for medical responsiveness would not be met."

Having a large house-officer staff (interns and residents) obviously increases the number of physicians and the amount of time a given doctor can spend with a patient.

At the MGH, the 691 active private physicians plus the 350 house officers provide one doctor for every bed. In addition, the MGH has about 300 MDs called either clinical, or clinical and research, fellows. At the hospital primarily to bolster their knowledge of specialties, they also assist in patient care under the supervision of private physicians.

An additional 58 honorary doctors and 46 members of the Board of Consultation help staff the hospital.

The quantity, however, is matched by quality. Interns are one year beyond their medical degree, and residents go from two to six years beyond depending on their specialty. One chief resident in surgery at the MGH is now in his tenth post-MD year.

Even with their skills, the house officers are supervised by staff doctors in caring for ward patients.

With private patients, interns and residents provide "another opinion" for the private physician as well as a backup for overnight emergencies.

(Continued on Page 4)

Teaching + Research = "Best Possible Care"

(Continued from Page 3)

Dr. Ellis said that the interchange among various physicians and the large number of teaching sessions available provide a "constant opportunity for continuing education in a teaching hospital."

Dr. Daniel D. Federman, an MGH staff member, who is Associate Dean for Continuing Education at Harvard Medical School, stated:

"The demand for continuing education is rising at the teaching hospitals."

Dr. Stephen E. Goldfinger, an MGH staff member who is Director of Community Programs for the Department of Continuing Education at Harvard Medical School, sees an encouraging increase in continuing education in the community hospitals near Boston. His task at the medical school is to encourage this trend by making such education more accessible to the communities.

The same accessibility of experts, which makes continuing education thrive in a teaching hospital, facilitates consultation about the care of a given patient be he under a private physician, as was Professor McWhorter, or in a ward.

"There is a free ease of consultation both formal and informal," Dr. Ellis said. "Formal because of the geographic location of outstanding men of all fields within one institution. Informal because the doctor meets friends and colleagues in the lunchroom and in the corridor. That makes it easy to discuss a special problem without having to lead the man to the bedside. And when you need to, you can lead him to the bedside."

Teaching hospitals traditionally carry out a large amount of research in their laboratories. The National Library of Medicine in Bethesda, Md., received last month 22 motion picture films representing some of the outstanding surgical advances of the past 20 years.

While the list does not necessarily represent THE 22 most outstanding advances of that period, most surgeons would agree that the operations all represent important improvements. Nineteen of the 22 procedures were developed in teaching hospitals including the MGH. The remaining three were devised in clinics which also do teaching.

Even basic research in teaching hospitals benefits the patient. An example was a study undertaken by two Harvard teaching hospitals – Boston City Hospital and the MGH (December *MGH News*).

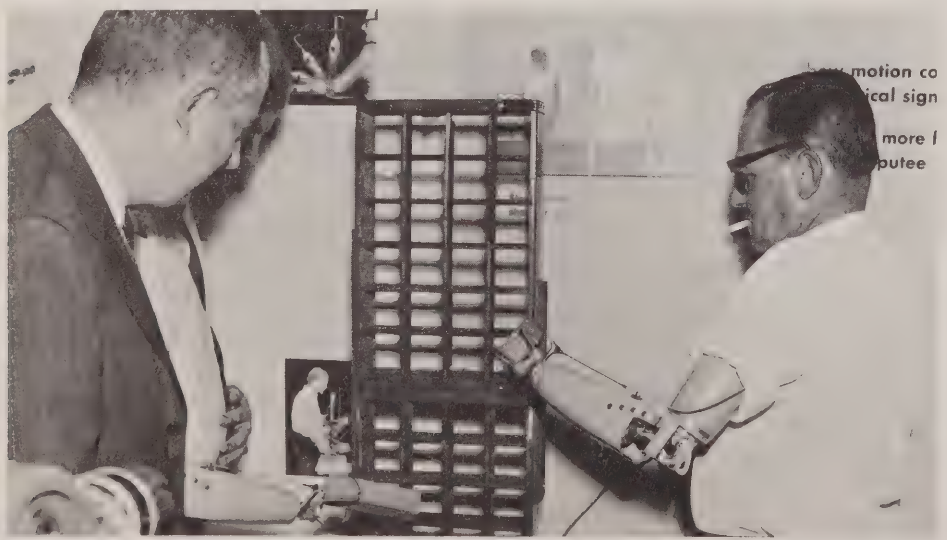
"The advances in research which are pertinent to patient care are liable to be known first at the teaching hospital," Dr. Federman said.

". . . The excitement generated by research activities and the quick dissemination of their results are among the special features of the larger teaching hospitals. . . . Such institutions must also, however, build in very careful research safeguards to protect the patients."

Dr. Ellis added a note of caution about the future:

"We must never lose sight in our multipurposed hospital with major teaching and research commitments that the patient's care and interests must ever be our number one commitment. There are obvious forces in the teaching hospital that may lead to poorer patient care unless this remains the number one commitment by physicians, administrators, nurses, technicians and researchers."

Often situated in the hub of urban blight, the teaching hospital is called upon frequently to help the disadvantaged. In the fiscal year ending Sept. 30, the MGH gave $1.8 million of free care to those unable to pay.



The prosthesis that the amputee can literally think into action, the Boston Arm, is an example of results from sophisticated research by a teaching hospital, the MGH, together with Harvard Medical School, MIT and Liberty Mutual Insurance Co. Costs of research projects are paid for by government and private support rather than by patients.

In Boston alone there are 24 neighborhood centers set up to provide health service to communities like Charlestown. Most of these centers are associated with teaching hospitals affiliated with Harvard, Boston University or Tufts Medical Schools.

After patient care, education is a primary function of a teaching hospital. Besides its many training programs for physicians and researchers, the MGH maintains educational programs for a number of other hospital workers.

Included are schools for both registered and licensed practical nurses, dietetic interns, nurse pediatricians, various technicians, unit managers, housekeepers, therapists, and others.

Some classes train large numbers of economically and educationally disadvantaged people. Like many other teaching hospitals, however, the MGH is striving to increase the number of deprived individuals involved.

More than 60 percent of the residents in the MGH medical service go on to full-time teaching posts in medical schools around the country. They thus provide a cadre to train an increasing number of physicians.

Just as the teaching hospital faces a surging pressure to help educate more sorely needed doctors, it is increasingly asked to develop more effective ways of delivering health care.

"Its proximity to the rest of the university and its experts," Dr. Federman said, "gives it the potential to try new forms. It has the opportunity and obligation to innovate."

In 1969, Dr. Knowles told Sen. Abraham Ribicoff's Subcommittee on Executive Reorganization:

"The urban teaching hospital articulates science and technology, teaching and research with the wants and needs of the people. As such, it occupies the center ground where decisions are made (or where outside decisions are felt) which will determine the degree of success in resolving the major issue facing medicine – how to improve the organization, distribution and utilization of the fruits of medical science and technology."

The new patterns of care developed reach the community hospitals as well, and, combined with innovations by those institutions, benefit the entire nation.

Similarly, new techniques for administering hospitals more efficiently usually develop in teaching hospitals. The computer is one example of an administrative tool finding increasing favor in the administration of large teaching institutions.

Sometimes considered a handicap, largeness often works to the advantage of an institution. Former Harvard University President James B. Conant found in his study on high schools that smaller ones are by nature inefficient.

In his *Medical Counterpoint* editorial, Dr. Rabkin wrote:

"It is also not true that the teaching hospital, being larger than most, tends to be less efficient. The reverse is more likely so, since the teaching hospitals tend to attract the best fiscal and administrative managers."

Large hospitals often group patients by type of illness. Such groupings allow a nursing service to train its employees to care for specific types of patients with their specialized needs.

The community hospital, on the other hand, often has too few intensely ill patients to maintain more than one or two – if any – intensive care units. The intensive care nurse in such an institution must spread her knowledge to learn widely varying problems of many types of illnesses.

In a hospital such as the MGH one group of nurses specializes in heart problems, another in lungs, a third in nervous system disorders, etc. Similar groupings become possible in nonintensive care units as well.

By the very fact that they do provide highly specialized services, teaching hospitals save community hospitals from spending vast sums on costly equipment and personnel.

"There are areas and services we do not offer," said Thomas F. Hennessey, General Director of Leonard Morse Hospital in Natick. "Now this means we are going to refer to the appropriate teaching hospital most of our brain surgery and a lot of our neurology, and probably going to refer any transplant work and all our deep therapy whether it's cobalt or X-ray."

By virtue of its location, the teaching hospital also has to provide a backup in time of civil strife or catastrophe.

"When there is civil strife," Dr. Knowles said, "it's concentrated in the city. Therefore, we have to plan for the disasters, civil riots and civil strife."

In the aftermath of the Coconut Grove holocaust 30 years ago, the MGH and Boston City Hospital treated vast numbers of people. Teaching hospitals in several communities have performed similar services in riots which have erupted in more recent times.

Dr. Leaf summed up his own opinion of teaching hospitals succinctly:

"Where teaching is going on, medical care is better. Where teaching and research are going on together, the best possible care is available."

Top Medical Care – A Costly Commodity

The story is often told of the patient who suffers a relapse when he receives his hospital bill.

And if care in community hospitals is expensive, that in teaching hospitals is even more so.

It takes nearly twice as many employees to run the average teaching hospital as the average community institution.

"Some people ask, 'Why do you need so many performers in a symphony orchestra,' " said Dr. Ellsworth T. Neumann, MGH Administrator. " 'They're too expensive,' they say. 'Why can't you get along with three or four like a rock and roll group?'

"Well," said Dr. Neumann answering the question, "you can't get top-quality symphonic music out of a rock and roll ensemble."

The biggest single reason for the full orchestra in the teaching hospital is to take care of the difficult cases (like that of Professor McWhorter) referred by the communities.

"These patients," said MGH General Director Dr. John H. Knowles, "need more nursing, more specialized and technical help, more diagnosis, more everything, and a longer stay to boot."

As medicine has become increasingly complex, hospitals – especially teaching institutions – have had to expand their staffs. In 1910 the MGH had 24 interns and no residents. By 1955 there were 30 interns and 116 residents. Now there are 45 interns and 305 residents.

Nurses rose from 17 graduates and 71 students to staff the institution in 1902 to 1,200, not including students, in 1970.

Technology has also uncovered a need for more allied medical personnel.

"Take the technicians who do inhalation therapy," Dr. Neumann said. "Some community hospitals don't have any inhalation therapists. We find them so indispensable that we have had to increase their numbers until we now have 35." Just five years ago there were 12.

In addition to rising numbers of employees, labor costs have soared. Long among the most poorly paid in America, hospital workers in recent years have demanded and increasingly received fairer salaries.

Wage increases have hit the teaching hospital, situated in high-cost urban areas, harder than the community hospital. While the application of minimum-wage laws benefited the unskilled hospital worker directly, professionals have shared the rise.

In 1952 when Dr. Knowles was a starting resident, he earned $800 a year. Today's beginning residents earn $9,500 annually.

Starting nursing salaries have leaped from $2,631 in 1951 to $8,320 today. These too tend to be higher in teaching hospitals than community institutions.

In suburban and rural hospitals employees hold their posts longer than their teaching hospital counterparts. Transient workers in any industry cause costs to rise.

(Continued on Page 6)

Teaching hospitals often maintain educational programs for professionals other than physicians and nurses. Here Marilyn Medaugh, a dietetic intern, assists a patient in selecting menu items for her special diet. Miss Medaugh is one of 27 graduate students enrolled in the MGH's 1970-71 class, the largest dietetic internship in any private hospital.

Top Medical Care: A Costly Commodity

(Continued from Page 5)

Dr. Knowles spoke of another source of expense that teaching hospitals in particular encounter.

"The teaching hospital, as an urban institution, is asked to do a considerable amount of free work with a patient clientele that has staggering social and economic problems."

Large, overworked outpatient clinics, found mainly in teaching hospitals, provide much of this free service.

Personnel salaries form only part of the package of increased technological costs. Expensive equipment has become rooted to modern treatment of the more complex diseases.

Dr. Alexander Leaf, Chief of Medical Services, told the Minnesota Society of Internists last April:

"Open-heart surgery, assisted respiration, dialysis, acute coronary care, organ transplants, etc., are very expensive in technology, skilled personnel and expert knowledge."

The Respiratory Unit where Professor McWhorter (bill on page 8) received much of his care now costs $265 a day because of its expensive equipment as well as its abundance of costly personnel.

"The long-range benefit far outweighs the cost as far as I'm concerned," Dr. Knowles said. "Far fewer people die in these intensive care units, and the morbidity of disease is reduced."

In his Minneapolis talk, Dr. Leaf noted a rise in the number of very sick requiring high-cost treatment at the MGH:

"An increase in Emergency Ward admissions has resulted in an increase in the number of acute, critically ill patients filling our beds."

His address points to augmented federal financing of health services of from about $1½ billion to about $12 billion in about five years:

"Since little was achieved in comparably increasing the quantity of services which could be delivered, a substantial inflation in medical costs has resulted. Health care generally has been provided on the basis of a classic economy in which services as well as commodities are bid for on the open market.

"The vast infusion of federal monies into competition for limited health resources has brought about a rapid and seemingly endless escalation of costs. At the top of the peak of the rising health costs are the teaching hospitals."

Open-heart surgery prolongs human life and allows the patient to live more normally. Because of the size of the skilled operative team and the cost of the heart-lung machine, the procedure is an expensive one.

Another of the reasons teaching hospitals cost more than their community counterparts is the teaching function itself. Medical schools like Harvard pay the costs of educating their students although these costs are partially covered by tuition. Other educational expenses, however, fall to the hospitals.

How much in dollars and cents baffles even the leading hospital economists. Said Lawrence E. Martin, Associate Director and Comptroller of the MGH:

"I defy anyone to show clearly what part of a teaching hospital's expense comes from teaching costs themselves. . . . Teaching allows us to produce a better brand of medicine, but you can't put a dollar value on the improved care."

Mr. Martin said another major part of the problem comes from trying to determine the boundaries between teaching and patient care.

He cited as an example the Department of Radiology. The hospital pays 38 residents in radiology from $8,000 to $11,000 each a year.

These graduate MDs are all increasing the depth of their skills in the chosen specialty. They receive instruction and supervision from experienced radiologists.

When they read an X ray, they are performing a service for the hospital. When a senior staff radiologist checks the interpretation, he is teaching as well as providing patient care.

"If we did away with these residents," Mr. Martin said, "we would eliminate some $400,000 in salaries. How many more staff men would we have to add, however? We know teaching makes it more expensive. How much more we don't know."

A similar problem applies to nonphysicians. It costs the MGH $1,974,000 a year to operate a school for registered nurses. At the same time these nurses provide 215,000 hours of service on the floors.

That figures to about $9 an hour of service, nearly twice an RN's salary. Clearly, such service is not worth that sum. On the other hand, hospitals find it difficult to calculate in dollars and cents the value of a young, eager student whose inquisitive mind stimulates the experienced nurses to constantly improve their own professional standards.

"We continue to operate the school for two reasons," Mr. Martin said. "First, if we close down, who is going to train the badly needed nurses? We feel a moral commitment to the community to keep on training nurses. Less altruistically, we know we are going to get a certain percentage of these well-qualified graduates to work for us.

"If you have a program for doctors, student nurses, X-ray technicians, etc., there is no doubt this costs money."

Hospitals such as the MGH train vast numbers of professionals in many specialties. Last year the MGH graduated 27 dietetic interns, for example, the largest such voluntary hospital program in the country.

To provide instruction, teaching hospitals need costly space for conferences and classrooms.

"When you consider the much more complex care provided to sicker patients, the high cost of increased technology, the teaching costs, plus all the other factors involved in providing top-quality care," Dr. Neumann said, "what is astonishing to me is that the cost difference between community and teaching hospitals isn't much greater."

One reason is that large teaching institutions save money by buying supplies and equipment in large quantities.

Another is that research funds come from the government and private foundations rather than the patient.

"The costs of research are not passed on to the patient," Dr. Knowles said.

Another factor which helps keep the patient cost in teaching and community hospitals more comparable involves length of stay. Patients in teaching hospitals tend to stay longer because their illnesses are more intricate and severe. On the other hand, what meager statistics are available indicate that the length of stay is comparable when the illnesses themselves are.

Reins held on physician salaries help to curb teaching hospital costs. Harvard Medical School, for example, limits the amount of money a full-time faculty member may earn from all of his professional activities, including care of patients.

As a result, some of the biggest names in Boston medicine earn only a fraction of their potential. And researchers, who have no private practice to supplement their incomes, tend to be the lowest paid of all.

One complaint related to costs in a teaching hospital may be justified.

"We have a tendency," Dr. Knowles said, "to overdiagnose and overtreat a patient and overuse the technology of X rays and lab tests, particularly on the public services."

Dr. W. Gerald Austen, Chief of Surgical Services at the MGH, agreed that interns and residents are inclined to overtest:

"They tend to order more tests as a group than an experienced physician does. I think, however, it's a rather small item financially, and it occasionally ends up being of great value to the patient.

"Tests that I would not order myself sometimes end up being the crucial ones."

Another charge about teaching hospitals is that they are more impersonal than the community hospital. Thomas F. Hennessey, General Director of Leonard Morse Hospital in Natick, said:

"You can't avoid getting impersonal with the patient as you try to expose the trainees to the patient who is the clinical material, the teaching material."

Dr. Knowles conceded that the charge has merit:

"We are constantly struggling to make sure our environment is warm and personal and caring.

"Part of the problem is that the patients we treat have such tremendously complex diseases that it is hard to find the thread of continuing one-to-one care. The large number of physiotherapists, oxygen therapists, etc., needed for such cases may confuse the patients.

"Then too, we have to do so much intricate testing with big machines, X rays, blood tests, etc., that the patients have numerous encounters with machines, and it looks to them as though they are full into the technological society.

"The crux of the matter is, however, that they have their best chance of getting well in such a place, and if I had my choice, I would rather suffer with a little impersonality as long as I receive excellent care for my complicated illnesses."

Community Hospitals: First Bastion of Care

Routine illnesses are regarded by many as more the province of the community hospital than the teaching hospital.

"For a routine cholecystectomy [gallbladder removal] or hernia, there is no reason to have it done in a teaching hospital," Dr. Stephen E. Goldfinger said. Dr. Goldfinger is Director of Community Programs for the Department of Continuing Education at Harvard Medical School.

"It is cheaper in the community hospital, and there the niceties of comfort may be better for the patient.

"Then too, getting to the community hospital is usually much easier for the visitor. So is parking once he arrives."

Dr. Alexander Leaf, Chief of Medical Services at the MGH, agreed with Dr. Goldfinger:

"The simple problem should be handled in the community hospital with backup at a teaching hospital."

Dr. Goldfinger also believes that the doctor in the teaching hospital may be getting a biased view of the care given in the community. The bias comes from seeing the few cases referred to the teaching hospital that were not handled well or could not be managed in the local hospital.

"I have been struck by the extraordinary number of exciting clinical problems in community hospitals," Dr. Goldfinger said. "They don't all get here to the teaching hospital, and most are well handled.

". . . There is no such thing as *the* community hospital. There are good ones, and bad ones."

Thomas F. Hennessey, General Director of Leonard Morse Hospital in Natick, said:

"As the community hospital gets larger, it grows more complex, and it's no longer a measure of a hospital to say it has so many beds. What you have to know is how well organized are the professional departments. . . .

"The other thing is that the geographic location of the community hospital has tremendous bearing on its ability to enjoy the influence of the teaching hospital.

"We, for example, are 25 minutes up the Mass. Turnpike from Boston. We can bring your teaching staff here as guest lecturers. It is convenient for them, and our men can enjoy this influence from the teaching hospital.

"And in turn, our doctors can get in their cars and go to a seminar that your hospital is putting on. On the other hand, this is not so easy for the physician 100 miles away.

"The community hospital that is geographically close to a teaching center generally seems to be a little more on the ball. They tend to grasp innovative services very early."

A number of persons interviewed emphasized that the patient population is best served when the community hospital and the teaching facility work hand in hand, each concentrating on its sphere of excellence. The physicians and administrators agreed that where such relationships exist the patient is assured of the best of medical care.

The teaching hospital and the medical school work closely together. This scene dates from 1853, a time when Harvard Medical School (right) was adjacent to the MGH's Bulfinch Building.

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A Shambles Before; A Mountain Climber Now

(Continued from Page 1)

but the blow had additionally caused a concussion. Likewise, the three rib fractures proved simple, but they resulted in severe lung problems.

His right eye was irreparably damaged and would have to be removed. His left eye suffered severe damage. Its fate was questionable.

Either the lung problems or the skull fracture was enough to cause death. Yet these proved just an introduction to the book of the professor's medical problems. Indeed, two four-inch thick volumes of 8½-by-11-inch pages document the next four scarcely believable months.

Use of Respirator

A tracheostomy was required early to allow insertion of a tube for breathing. With his chest caved in and his lungs injured, he also needed a tube between his ribs to suck potentially dangerous air out of the area (pleural cavity). Later, to breathe, he required use of a respirator, originally developed for polio victims.

This combination of problems and treatment often brings pneumonia, and it did. Professor McWhorter spent two of his hospitalized months in the Respiratory Unit where staff doctors and residents, backed by specially trained nurses, tightroped a high wire of precisely balanced care.

But even the lung problems, dangerous as they were, proved but one crisis Professor McWhorter was to face.

At one point his spleen developed a delayed rupture. Emergency surgery saved him on that occasion.

But the most puzzling complication was a gravely high fever that also seriously threatened his life. For weeks his temperature lingered ominously between 103 and 105 degrees, once spiking at 106.

Every diagnostic test devised for fever of unknown origin was tried. None disclosed the cause, and his fever defied every drug used. An allergy to at least one common antibiotic further complicated Professor McWhorter's treatment.

Although tests failed to prove it, the Infectious Disease Unit was able to point a finger at right-sided endocarditis, an inflammation of the heart's lining, as a likely cause. The specialists ordered the most effective antibiotic. In a few days his fever dropped dramatically and ended.

Salvaged Left Eye

Although his life was not sight dependent, his profession is. A specialist from the adjacent Massachusetts Eye and Ear Infirmary removed Professor McWhorter's right eye and salvaged his badly damaged left.

For one period while he lay in the Respiratory Unit fighting for his life, Professor McWhorter lost the sight of the left eye. Once he required surgery to insert a stomach tube, and for months he had to be fed by tube.

With high fever, loss of sight, seven major operations, central nervous system damage, months of lying in bed, and a few dozen other problems, he slipped in and out of mental clarity.

Finally, with his bones knit, his nose and face reconstructed by plastic surgery, his fever gone, his lungs clear and able to breathe fresh air by themselves, his left eye able to see, his jaws healed and able to chew food, his concussion gone, his heart healthy, his mind clear, and his strength flowing back, Professor Alan L. McWhorter was able to go home.

* * *

Professor McWhorter *walked* out of the MGH on July 22. Between March 29 and his discharge, MGH experts from at least 13 medical specialties played roles in his recovery. Also aiding in his treatment were nurse specialists, therapists and social workers.

Few community hospitals in the nation could have managed either his lung or his infection problems. Only a teaching hospital – and perhaps few of them – could have provided the whole symphony of complicated care represented by the entire complex of his ills.

Some specialists added a few notes; some a few measures; others a whole movement. The entire disarray of medically fragmented parts had to be carefully orchestrated into a meaningful composition by the supervising surgeon who directed the care.

The resulting symphony is a man who bears little resemblance to the disarrayed parts the medical orchestra had to work with on March 29, 1969. Soon after discharge, Professor McWhorter was ready to direct his own life. In September of 1969, some six weeks after he left the MGH, he returned to his MIT duties.

Private Room Care	$ 4,462.00
Respiratory Unit Care	16,500.00
Operating Room (7 times)	1,881.00
Anesthesia (7 times)	800.00
Special Nurses	3,516.00
Ancillaries (X ray, Laboratories, Inhalation Therapy, Medicine and Medical Supplies)	11,205.35
Total	$38,364.35

A copy of Professor McWhorter's hospital bill for his four-month stay at the MGH. Almost all the bill was paid for by Blue Cross. The bill illustrates graphically the expense of highly complex hospital care.

MGH News

Vol. 30 No. 2 MASSACHUSETTS GENERAL HOSPITAL, BOSTON, MASSACHUSETTS February, 1971

MGH Ponders Licensing As Educational Institution

The MGH is examining the possibility of a move that could have widespread financial consequences for teaching hospitals.

"For the last five years," said Dr. John H. Knowles, General Director, "I have been concerned with licensing this hospital by the state as the educational institution it is. The time is now ripe to pursue the matter actively."

If state approval proves possible, the hospital would become eligible for funds now granted only to educational institutions. Wide varieties of private foundation and governmental support could become a reality.

Dr. Knowles is discussing the question with Dean Robert H. Ebert of Harvard Medical School.

"We would seek the license as part of Harvard," Dr. Knowles said.

Like many teaching hospitals, the MGH traditionally has engaged in both teaching and research as major pursuits that strengthen the most important purpose, care of patients. No research expenses are charged to the patient.

Some of these education costs – such as the ones involved in training medical students – are not borne by these hospitals. Others, such as nursing schools, largely are.

Inevitably a portion of the educational costs in a teaching hospital finds its way onto the patient's bill. Some argue that this is justifiable because education helps improve the quality of care given in the teaching hospital.

Dr. Alexander Leaf, Chief of Medical Services at the MGH, is one of those who, like Dr. Knowles, believe that there should be a more equitable

(Continued on Page 4)

The Teaching Hospital in Tomorrow's World

Powerful forces are reshaping the teaching hospital.

Manpower shortages, fragmented care and treating the sickest of patients are strong motivating factors. Some of those who believe that the teaching hospital deserves special financial support because of its unique role in health care see another side to the coin.

"We have an obligation to make certain we use the facility properly," said Dr. Alexander Leaf, Chief of Medical Services at the MGH and Chairman of the Curriculum Committee at Harvard Medical School.

Dr. Leaf said that under the present system in the United States, teaching hospitals find themselves using their specialized personnel and facilities for many patients who would benefit as much from care in lower-cost, chronic-treatment institutions.

"I'm sure," he added, "that such use is not what the public is paying for. More high-quality, low-cost, chronic-care facilities are needed for the increasing numbers of patients suffering long-term, often incurable illness."

Providing more chronic and extended care institutions is one likely course for the nation. Another lies in increased practice of preventive medicine.

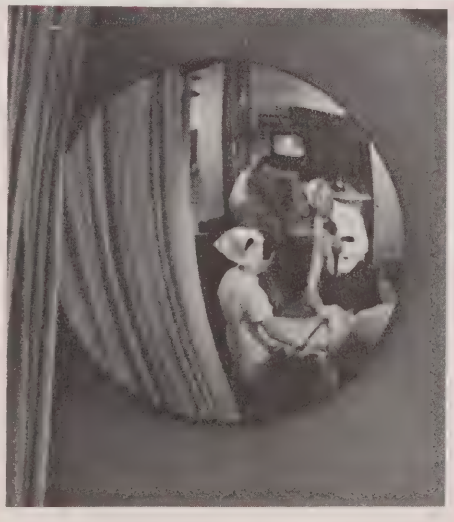
At the American Medical Association's Clinical Meeting last Dec. 1 in Boston, Dr. John H. Knowles, General Director of the MGH, predicted that in the year 2000:

"Financing mechanisms will put premiums on preventive medicine and health education, and public television will have regular programs on these subjects as the amount of pornography and violence shown is correspondingly reduced. Physicians will be rewarded for the amounts of surgery and hospitalization they are able to avoid or forestall in their communities."

Preventing illness is obviously the best means of avoiding the high cost of hospitalization for a serious or complicated disease. Many administrators would agree with Dr. Knowles that preventive medicine could receive no bigger push than from coverage by health insurance such as Blue Cross or Medicare. A universal health insurance is expected before long to influence not only preventive medicine but also the entire system of health care.

In testimony before Sen. Abraham

(Continued on Page 3)



A consultation over television at the MGH. A glimpse into the future? Story on page 7.

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EDITORIAL:

About the Only Certainty Is Change

In this issue the *MGH News* attempts to predict the future of the teaching hospital. About the only certainty is that its mode of delivering health care will change. The public is obviously dissatisfied with the present health care system in the United States. And well it might be! The problems are many. Perhaps one of the biggest reasons is the exploding population. A system developed when the country consisted of 120 million or so rural and urban dwellers is sagging under the crush of more than 200 million people. Most of them live scrunched into cities that teem with disease. Drug and alcohol abuse, venereal disease, and pregnancies among unmarried young women have crept out of the slums and into the middle- and upper-class homes. Air and water pollution take an increasing disease toll, and noise pollution and overcrowding contribute to the toll in mental disease. Medical science by its success in prolonging life has added to the population. People now live long enough to contract lingering illnesses of old age.

Another reason is the thrust given by Medicare and other programs to encourage lower-income groups to seek medical aid. The downtrodden, who once accepted mediocre care as a luxury and no care as their lot, now demand the best care as their right. These long-overdue demands come at a time when hospital workers have been seeking and receiving long-overdue pay increases. The result of these convergent demands, accompanied by expensive new technology, has been inflation of hospital costs superimposed on an inflated economy. And the result of the vast number of new patients has been long waiting periods to get into the inpatient systems of hospitals and near collapse of the outpatient systems.

All this leaves medicine with three monumental tasks. One is to attract more people to the overburdened health field. The second is to restructure the existing system to utilize personnel in the most efficient possible way. This means finding methods of meeting the fantastic new demands placed upon it. The third is to educate the public in the proper ways of getting the best care. Only the cooperation of the news media can make this last possible. In the final analysis, public education is the mortar which holds health care together. The best of systems will collapse under the weight of misuse. Examples abound. People constantly waste their own time and that of the health professional by understandable inability to master the intricacies involved in getting care. No matter how efficient the system becomes, this will always be a problem area. Nevertheless, the size of the problem can be considerably reduced by a concerted effort by people in the health care field. Surely the public will prove receptive.

The Carnegie Report: A Long-Range View

The Carnegie Commission on Higher Education published last October a special report on policies for medical and dental education.

Many of its recommendations in a section on the future of health care delivery are either directly or indirectly relevant to the future of the teaching hospital. The following are excerpts from that section:

1. There will be a spread of prepaid group practice plans, such as Kaiser-Permanente plans . . . and others. The Kaiser plans encourage preventive services by making a variety of them, including multiphasic screening and regular, periodic physical examinations, readily available.

Members are either not charged for office visits or, at most, pay a nominal registration fee. There is a wide variety of specialists on the Kaiser staff so that members are assured prompt attention by appropriate professionals. . . .

2. There will be much greater emphasis on achieving effective functioning of true health care teams in which the physician or dentist is at the center of the team, and the work of allied health personnel is subject either to his direct or indirect supervision.

3. There will be a shift to greater emphasis on care outside the hospital in a wider variety of health care facilities than has been available. Neighborhood health clinics, facilities for ambulatory care of convalescing patients, and homemaker services to facilitate care in the home are all needed. . . .

4. Gradually we are likely to shift toward a situation in which health care is a public utility. The government's role in protecting the health of the population will inevitably become broader in scope. . . .

5. The rate of acquisition of new knowledge and technology in the biomedical sciences will continue to be impressive. Progress in diagnosis and therapy, involving increasingly complex facilities, as well as trained technicians and retrained physicians, will continue at a rapid rate. . . .

6. The education, service, and research functions of medical and dental schools will become more effectively oriented to the shift from a nonsystem to a system of health care delivery. . . .

The Teaching Hospital in Tomorrow's World

(Continued from Page 1)

Ribicoff's Subcommittee on Executive Reorganization, Dr. Knowles urged medicine to concern itself with the larger field of social welfare and to develop a unified concept of a community's health.

"The cost of such services," Dr. Knowles testified, "although absolutely increased when provided initially to such deprived communities, should be more than justified through the economic advantages of preventing disease, or of rehabilitating those with disease, to say nothing of the better use of lower-cost facilities (than hospitals) where appropriate."

How is the teaching hospital likely to fit into the total health care picture?

Work Together

In an address before the Minnesota Society of Internists last April, Dr. Leaf said:

"The teaching hospitals, I believe, will have to fit into a more effective general health delivery system rather than try to remain isolated and independent islands of excellence as many of them have viewed themselves.

" . . . We need to work together with the larger medical community to develop regional medical plans. Primary health workers will need to be available in the community at one or more conveniently located ambulatory facilities which are in turn backed up by nearby community hospitals.

"The teaching hospitals will serve as the back-up resource for a number of community hospitals. [This means that the teaching hospital itself would see far fewer patients with uncomplicated, routine diseases. Efforts would be directed rather at the more complex ailments which the institutions are peculiarly suited to treat.]

" . . . What happens to the training of our students and young physicians in a system in which the teaching hospital of today serves at one pole of the system?

A Realistic Goal?

"I think our training programs will extend into all units of this rationalized health delivery system. More practicing physicians at all levels will participate in teaching activities and have affiliations with the larger referral facilities. . . . I also see the increased use of paramedical personnel and modern technology in the delivery of more routine care at the primary level of interaction of the patient with the health care system.

"Can we accomplish such a goal? I think we must. Failure to do so can only doom what we cherish and enjoy in patient care, teaching and research to a further state of anarchy with the public increasingly disenchanted with the pleading of special-interest groups. Success, however, will be achieved only with cooperation between an enlightened, cooperative medical profession and an educated supportive public."

Obligations We Have

Dr. Knowles agrees that medical students, interns and residents will receive part of their training in places such as the MGH-Charlestown-Bunker Hill Health Center.

"They will be participating more heavily in the total picture of the community's health. They will be expected to know more about birth control and abortion laws and family planning services, as well as being able to testify as expert witnesses about the control of pollution. And I feel very strongly that those are all obligations that we have, if we are really interested in health."

Dr. Knowles predicted that in 10 to 20 years, practically all the teaching hospitals in the country will maintain community health facilities like that in Charlestown.

Nursing schools — one of many educational programs at the MGH.

Community Hospital Links

Dr. Mitchell T. Rabkin, General Director of Boston's Beth Israel Hospital, in an editorial in the November issue of *Medical Counterpoint* magazine, emphasized the future ties between teaching and community hospitals:

"One of the most important activities at teaching hospitals over the next decade will be the establishment of closer relationships with community hospitals in order to rationalize better the delivery of care, in order to permit movement of patients from one institution to another with ease, in relation solely to the need of the patient, but without loss of his personal identity or his relationship with his doctor.

" . . . To personalize care in such a system, the patient's physician should be able to move with facility from one institution to the other."

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MGH Ponders Licensing As Educational Institution

(Continued from Page 1)

solution since teaching hospitals educate health professionals for the entire country.

"Trained physicians," Dr. Leaf said in a speech to the Minnesota Society of Internists, " . . . are national assets which should be supported by all those who potentially should benefit, not just those sick who come to the teaching hospitals for care."

Licensure as an educational institution would be one way of spreading the costs. This is the course taken by one nonhospital, the former Rockefeller Institute in New York City.

Basically a research institute, it simultaneously carries on an important educational mission. Some years ago it became Rockefeller University. While its basic function as a research organization remains the same, the institute has obtained licensure as an educational entity, thus qualifying for wide varieties of private foundation and government support.

Equals Med School Students

Similarly, becoming licensed as an educational institution would not change patient care at the MGH in any way. The license would recognize the vast amount of education that goes on here and broaden the traditional bases of support.

Besides educating medical school students, the hospital trains about 350 interns and residents and roughly 300 MDs called either research, or clinical and research, fellows. The combined interns, residents and fellows thus trained about equal the total number of students in Harvard Medical School.

On page 7 are listed other courses or educational programs at the MGH.

"The MGH has an unusually large number of courses and students even for a teaching hospital," Dr. Knowles said.

Federal Financing

This large amount of educational activity may make licensure easier for the MGH than for smaller teaching hospitals. For the others, many believe the answer lies in different types of government support. In its major report last October, the Carnegie Commission on Higher Education called for an increase in federal support for medical education of up to a total of $1 billion by 1980.

"The Carnegie Commission believes," the report said, "that medical and dental education are critically underfunded. . . . To achieve these objectives will require that the federal government play a major role in the financing of health manpower education."

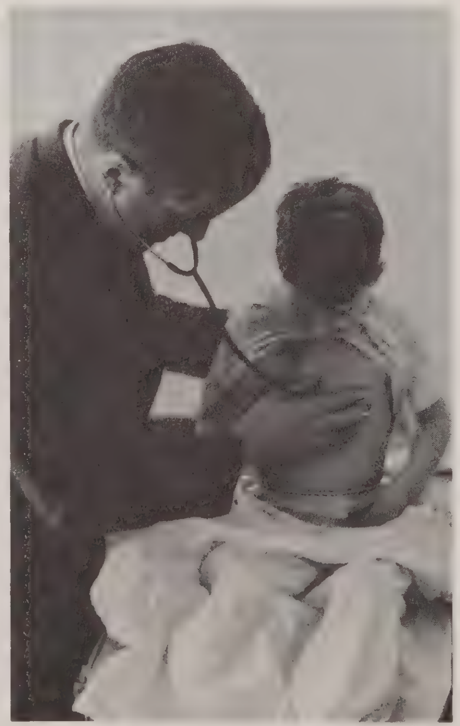
The opposite trend, however, has recently prevailed. Yet a new federal administration policy may be in the wind.

New Funding Needed

Until a few months ago, the federal government provided research funds that were used by both medical schools and hospitals for teaching as well as research. New regulations have limited such funds to research use.

In his Minneapolis speech, Dr. Leaf commented:

"Such tighter controls and reduced budgets may constitute commendable business practices, but they need to be coupled with some new means of funding medical education. At present we feel acutely the reduction in research dollars for the support of faculty with few, if any, new dollars coming to support education just at a time when the clamor for more physicians and more teaching comes from all sides.



"Trained physicians . . . are national assets."

" . . . The health manpower crisis also cannot be solved, I think, by a direct assault on our teaching institutions. Today many urban and rural areas need physicians. Both the public and physicians in these communities turn to the teaching hospitals in their recruitment efforts.

"When they find that the graduates from our teaching programs don't always share their own enthusiasms for the opportunities of general practice, we stand accused by the public and by our practicing colleagues of corrupting the coming generation of physicians with the glamour of academic or specialty medicine and of disinteresting them in a traditional role in community practice.

"There is a serious question whether traditional patterns of medical practice in the community can successfully provide the quantity and quality of medical care that modern advances in medical sciences and technology make possible.

Simplistic Approach

"The present administration seems to share this view that the health manpower needs of our country can be solved, or at least markedly improved, if all the young physicians training and working in our university teaching hospitals were flushed out into practice in the community. The restrictions in support of research and in training grants that the government is ordering seem to be motivated in part by this reasoning."

Dr. Leaf called this a simplistic and shortsighted approach. He pointed out a recent survey showing that medical school faculties (most of whom also staff teaching hospitals) comprise only four percent of the physicians in the country who are not in federal service or training.

"Forcing this group into full-time practice," he said, "would contribute little immediately to our health manpower needs and would severely cripple our capacity to train physicians for the future."

Physicians' Assistants

The educational demands on teaching hospitals and the medical schools with which they are affiliated are likely to increase. One of the major recommendations made by the Carnegie Commission was:

“That all university health science centers consider the development of programs for the training of physicians’ and dentists’ associates and assistants. . . .” Federal support was urged for this and other needs in medical education.

Hospital administrators realize that with increased governmental support increased control is likely.

“There is a tremendous political realignment of power and forces going on right now in the community,” Dr. Knowles said. “Some states have already written legislation so that every nickel spent in a hospital has to be reviewed by a community group.

Role of Consumer

“I think that a community should be able to determine what its institutions do. They should share power with the experts or the producers of these services, administrators, doctors and so on, so that they can reach a middle ground where the interests of both the hospital and community are served.

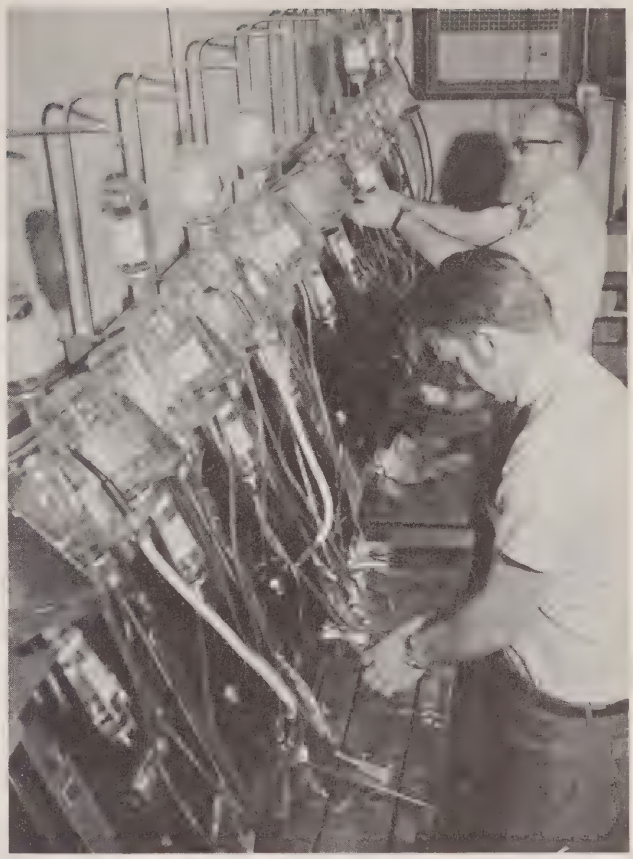
“On the one hand, if you leave it to the consumers alone, this would create a problem, because they don’t understand some of the critical work. On the other hand, it’s their hospital. They are the ones who built it, support it, pay its bills, etc., and they should have a very definite part to play in it. Traditionally this has been done through boards of trustees. I think quite frankly it’s got to be even broader than that.”

Rate Setting

Dr. Knowles said that some governmental and community groups have been helpful to the MGH.

“But I think,” he said, “that we are going to see a lot more of this type of intercourse between hospitals and outside institutions of government.”

One area where an increased outside influence seems likely is rate setting. As room charges have inflated faster than the rest of the economy, Blue Cross and other third-party payers have shown more and more concern about rates. Since the advent of Medicare and Medicaid in 1966, the federal government has also applied pressures and controls. Even so, hospital costs have continued to skyrocket.



"Prospective rate setting" without financial relief for unpredictable new procedures would not allow hospitals to take advantage of new and often lifesaving techniques.

Through Medicare and Medicaid the government has been reimbursing hospitals for these costs including room rates and other patient bills. At the end of the federal fiscal year, the government has been making a final payment based on charges that have gone up since the start of the year.

Now Washington hopes to encourage thrift by settling on rates at the beginning of the year and not allowing for a final settlement.

This procedure is called prospective rate setting.

“Such a procedure,” said MGH Associate Director and Comptroller Lawrence E. Martin, “places the burden on the hospital administration. If the administration is a poor negotiator and negotiates an unfavorable rate, the hospital is locked into its present situation.

Financial Relief

“If he is a good negotiator, his hospital may have some flexibility for improvements in patient care that become possible after the rate was determined.”

Mr. Martin favors a prospective rate-setting system which would allow for financial relief for unpredictable new procedures and other contingencies.

“Without relief mechanisms,” he said, “prospective rate setting would be an absolute disaster.”

Mr. Martin fears that prospective rate setting will fail to consider differences between teaching and nonteaching hospitals:

“I think it is going to take another two or three years of discussion before recognition that the teaching hospital, because of its specialized care of the very sickest patients, is by nature more expensive.”

(Continued from Page 8)

research and the sources for its support. What kinds of research programs are needed? How can they be funded?

Thus we have a multiplicity of functions and responsibilities. If the teaching hospital is to be managed properly, we must understand them all and be able to integrate them. Our first function is the best care of the sick (and more recently the prevention of disease), and this is the most demanding and critical responsibility we have.

This Issue
Concludes a Two-Part Series
On Teaching Hospitals

"Only One Serious Manpower Shortage"

"Americans deserve and can afford better health care."

With those words the Carnegie Commission on Higher Education begins its special report on higher education and the nation's health.

Listed are four components required to improve health care:

- More and better health manpower.
- More and better health care facilities.
- Better financing arrangements for the health care of the population.
- Better planning for health manpower and health care delivery.

The report concerns itself primarily with more and better health manpower.

"The United States today faces only one serious manpower shortage," the commission states, "and that is in health care personnel. This shortage can become even more acute as health insurance expands, leading to even more unmet needs and greater cost inflation, unless corrective action is taken now. It takes a long lead time to get more doctors and dentists.

"Higher education, as it trains the most skilled health personnel, has a great responsibility for the welfare of the nation. What colleges of agriculture once did for a rural society can now be done for an urban society by the health science centers – and that is to improve the quality of life for nearly all people in their areas."

Because of the great public concern for health care, and because of other reasons, the commission regards this as a good time to act. Goals set by the commission are:

- To provide more health care personnel of the right kinds.
- To achieve a better geographic distribution of personnel and educational facilities, particularly for the sake of the central city and rural areas.
- To ensure more equality of opportunity for women and members of minority groups.
- To provide more appropriate training for the work actually to be performed, heeding the constructive suggestions of students.
- To relate health care education more effectively to health care delivery.
- To limit costs to the greatest possible extent.
- In the context of modern times the report sees two weaknesses in the present medical education system which emphasizes biological research:

"It largely ignores health care delivery outside the medical school and its own hospital, and it sets science in the medical school apart from science on the general campus with resulting duplication of effort."

Two new models are viewed as appearing on the horizon. In one the medical school, besides training, does research in health care delivery, advises local hospitals and health authorities and in general orients itself to external service.

The second model calls for the basic science instruction to be performed at the main campus rather than the medical school.

"In this model (as in England)," the report states, "the medical school may be, essentially, a teaching hospital; but this is not necessary – it may, rather, carry on" all its traditional functions except for the first one or two years of science education.

The commission envisions a need for expanding the number of places for training doctors by 50 percent and dentists by 20 percent in the next 10 years. Use of women and minority group members is urged to fill these new places.

A substantial rise in the current 10 to 1 ratio of all health care personnel to doctors is predicted.

Also recommended are 126 area health education centers to serve sections without a health science center. Each center would be at a local hospital.

"The centers' educational programs would be administered by university health science centers," the report states.

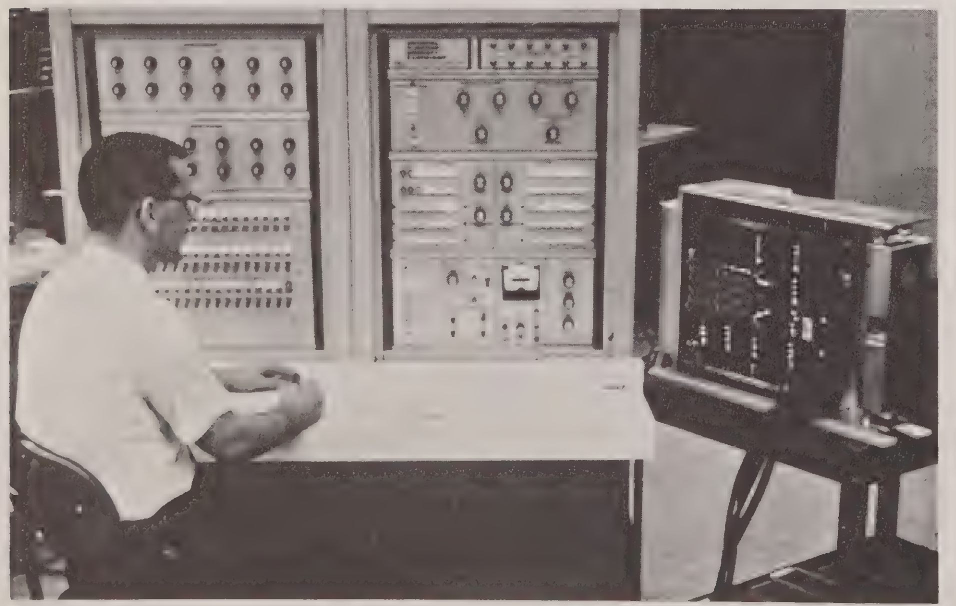
Reforms favored include:

- Shortening the time required to become a practicing medical doctor from eight years after a bachelor's degree to six years.
- Providing more flexibility for both the student and school by creating a degree between the bachelor's and the MD.
- Improving the curriculum by tying more closely together basic science and instruction in the care of patients.
- Improving the training of residents by giving the young doctor a wider variety of experience and more of it under skilled supervision.
- Creation of a National Health Service Corps.

The federal government is asked to meet more of the costs of medical and dental education. States are urged to support private medical and dental schools. Both the federal government and states are called upon to seek reforms and improvements as they expend their funds.

To reduce as much as possible the cost of its proposed changes the commission recommends:

- Requiring only three years instead of four for acquiring an MD degree.
- Reducing from four to three years the time it takes for a resident to



The computer is expected to have a much-increased role in the hospital of tomorrow.

fulfill his requirements. (The time now varies according to the specialty.)

- Teaching during the summer.
- Reducing the ratio of faculty to students.
- Entering two medical school classes a year, thus making better use of laboratory facilities and teaching personnel.
- Holding federal research expenditures steady as a percentage of the Gross National Product.
- Raising the minimum size of a medical class to 100 to obtain economy of scale.
- Using outside hospitals for clinical training rather than, or in addition to, subsidizing a university hospital.

Education Programs Cover a Wide Range

Educational programs at the MGH cover a wide range.

The hospital maintains two nursing schools. It conducts language courses for employees who cannot speak English; has a course for volunteer leaders from around the country; has postgraduate courses for doctors from many nations; trains physicians in community hospitals to operate emergency wards; and has a national program for training professionals in the care of alcoholics.

There are internships in dietetics, social service, pastoral care, nursing administration, clinical psychology and residencies in pharmacy, hospital administration, and visiting fellows in nursing.

In addition there are formal on-the-job training programs with salary, for electrocardiograph technicians, housekeeping aides, respiratory therapy technicians, medical transcriptionists, nursing assistants, surgical technicians, unit coordinators, and nurse interns.

Affiliated programs with tuition are offered in cytotechnology under the Boston School of Cytotechnology; language clinic courses in language therapy with practice teaching at Medford Public Schools; physical therapy with Boston University, Simmons College, Northeastern University; radiologic technology with Northeastern University.

There is also on-the-job training without formal programs for laboratory technicians in chemistry, bacteriology, hematology, histology, blood bank, research, plus unit secretaries, recreation workers, industrial engineers, and autopsy attendants.

Classified as helper-trainees in the maintenance shops are students from various trade schools in a work-study cooperative plan.

A Medical Revolution?

Referrals to teaching hospitals may be reduced by the practice of medicine over television.

"I think the television set is going to revolutionize medicine," said Dr. John H. Knowles, General Director of the MGH. "Television will link community hospitals with teaching hospitals, allowing ease of consultation. Such systems could do away with 70 percent of referrals sent from suburban and rural areas to hospitals like the MGH."

Telemedicine was born in April of 1968 when the MGH's Logan Airport Medical Station and the hospital were linked by closed-circuit television, funded by the U.S. Public Health Service. Since then, physicians at the MGH end have examined about 1200 patients over the system.

Increased Computer Role

Last year the Veterans Administration Hospital in Bedford, Mass., and the MGH were joined by a second system, like the first, directed by Dr. Kenneth T. Bird. Physicians at the two hospitals present patients for consultation. In addition, the Bedford-MGH link has widespread educational use for physicians, nurses and a large number of nonmedical personnel at the two institutions.

Dr. Knowles also views the computer as assuming a much-increased role in the hospital of tomorrow.

"The computer already has a role in teaching," he said, "but the surface has only been scratched. Computers are bound to become increasingly important in patient care, as a research tool, in scheduling patient admissions and discharges, in the automation of laboratories, and in the hospital business office."

Psychiatric care, one of six major sociomedical problems.

Six Major Problems Facing Both Society and Medicine

Both teaching and community hospitals have six major sociomedical problems confronting them in the opinion of Dr. Thomas S. Durant, Assistant Director of the MGH.

He listed drugs, psychiatric care, venereal disease, abortion on demand, chronic terminal illness, and alcoholism.

"Teaching hospitals in particular face these problems," Dr. Durant said, "because they are more widespread in urban areas. How do you effectively handle them?

"Unfortunately these are conditions that don't attract people to work on them because of any large financial remuneration. Nor does work in such areas increase the prestige of the practitioner.

"They don't stimulate a vast amount of scientific curiosity either.

"All six areas have to do with behavioral problems, and personal motivations are, therefore, critical factors. But these are areas where physicians are the least effective because of the demands of time.

"Yet, unless we can devise some method of handling these problems, we are left with less time for acute, critically ill patients."

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A View From the General Director's Chair

What is it like to direct a large teaching hospital such as the MGH? How do the administrative problems differ from those of a community hospital?

The MGH News *asked Dr. John H. Knowles, General Director of the MGH. His answer follows:*

The administration of an urban teaching hospital is much more complex because we have all the forces that are intertwined and entangled in the urban environment bearing in on us. A community hospital doesn't have to worry excessively about traffic patterns, or whether employees should ride the MBTA, or whether they need to have parking next to the hospital. Certainly the community hospital has its problems, but they are much smaller by comparison.

Secondly, on the one hand, we have advantages of population density in the urban location, because there is a large labor force available to us. On the other hand, we have the disadvantages of high turnover rates in a fluid labor force. In a small community people tend to live and work in one place for longer periods.

Thirdly, we are inextricably a part of the city's problems, whether in housing, transportation, civil rights, civil strife or poverty. All of this is concentrated in the city. We are part of it, pick up the results of it and must involve ourselves in the political process to try to alleviate it.

Urban renewal is largely a big-city phenomenon. When we want to construct a building, we have to spend several months gaining the permission of the urban renewal authority. This means presenting plans to the mayor, the head of the renewal authority, his architects, his city planners – to a multiplicity of forces.

On top of that, because we are large, we have a major leadership position in structuring contracts with Blue Cross. Because of our specialists in various aspects of hospital accounting and administration, we can be helpful in obtaining an adequate Blue Cross contract in behalf of the public. The same is true of welfare rates and our relations with city, state and federal governments.

"Our first function is the best care of the sick."

The teaching hospital has much more contact with agencies like public welfare. We must constantly work with the Welfare Department for improved speed of payment to hospitals.

The size of a teaching hospital such as the Massachusetts General places it in a position of leadership among hospitals when working with a variety of other agencies such as hospital rate-setting commissions and public-health councils.

We have to plan for disasters of a magnitude unlikely to occur in a smaller community. A tragedy such as the Coconut Grove fire could only be dealt with by a large hospital that is organized to cope with gigantic emergencies. When there is civil strife, it too is concentrated in the city.

The teaching hospital itself is so complicated that it makes administration difficult. There is not just one function but a multiplicity of them, and they are frequently in conflict. We have to know everything about the evolution of education and training, about colleges and universities, technical schools, community colleges.

We have to know what their roles are, and how they might be helpful to us and we to them. We have to set priorities and allocate scarce resources to frequently conflicting functions, e.g., patient care versus research, or community service versus teaching, and so on.

The development of the hospital must be balanced so both short- and long-range interests are well served. We have to know what the forces are that are trying to close diploma schools of nursing that are run by hospitals.

We have to know everything about

(Continued on Page 5)

MGH News

Vol. 30 No. 3 MASSACHUSETTS GENERAL HOSPITAL, BOSTON, MASSACHUSETTS March, 1971

Psychiatry and the Psychologically Normal Patient

Psychiatrists are participating increasingly in the care of the psychologically normal patient.

"It used to be," said Dr. Thomas P. Hackett, Chief of the MGH Consultation Service, "that the only time we were called upon to see patients was in the case of severe mental illness. Because the whole nature of psychiatry has changed with the increased emphasis on it in the general hospital setting, much more attention is now paid by other physicians and surgeons to psychiatric consultation.

"Most psychiatrists have spent their time with neurotics and psychotics, where they have been dealing with grossly abnormal patterns of behavior. Over the last 10 or 15 years there has been a renaissance of psychiatrists who want to work with medical and surgical patients not deviant enough to be called psychotic or neurotic."

Dr. Alexander Leaf, Chief of Medicine at the MGH, stated that the trend has taken the form of psychiatrists working with internists, surgeons, pediatricians and other practitioners to examine the psychological aspects of illness and medical care of patients.

A major reason underlying the recent trend toward increased psychiatric consultation is thus the growing recognition given psychosomatic medicine. Examples of the close relationship between the mind and states of both illness and well-being abound.

Dr. Hackett and another MGH psychiatrist, Dr. Avery D. Weisman, have described examples of what they referred to as a "medical hex." In one instance, a man in his midforties was

(Continued on Page 4)

Project Aims to Widen Treatment of Alcoholics

A unique experiment aimed ultimately at improving and expanding treatment for alcoholics all over the country will take place at the MGH in April and May.

With a grant from the National Institute of Mental Health's Division of Alcohol Abuse and Alcoholism, the project will recruit and train nurses and social workers in alcoholism.

Miss Eleanor Clark, Director of the MGH's Social Service and Director of the project, explained that one-third to one-half of families coming to community social agencies have at least one member with an alcohol-related problem. The tendency is to refer the person to an alcohol clinic. Due to lack of experience and insufficient knowledge of alcoholism, this is often the easiest way for workers to deal with the person.

However, Miss Clark points out, "There are not remotely enough alcohol-specialty resources to handle all the problems. In addition, people often resent being sent off.

"There is no reason why social agencies cannot provide services to these people."

Nurses in general hospitals, mental hospitals, industry and agencies like visiting nurse associations also see a large number of alcoholics. And in these areas, too, Miss Clark feels there is a paucity of education about alcoholism.

Miss Ruth M. Farrisey, RN, Executive Officer of the MGH Clinics and Nursing Supervisor for the program, said that most of the training nurses do get in dealing with alcoholics relates primarily to physical problems. She feels that nurses can also be very helpful in treating the social and psychological difficulties, not only of alcoholics, but also of their families.

"If the reservoir of local treatment resources were increased," Miss Clark said, "it would lessen the impact on the hospitals."

The pilot program will recruit and train 10 nurses and 10 social workers with at least two years of experience, if not already experts in mental health. In most cases, they will come from key positions such as administration, supervision, research or teaching.

For two months they will leave their jobs in agencies which see people with alcohol-related problems. Such organizations include family, child welfare, and community mental health agencies,

(Continued on Page 2)

Considered the country's fourth greatest medical problem, alcoholism occurs at all levels of society.

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EDITORIAL:

When a Human Life Is Threatened

A letter to the editor appearing in column 3 of this page asks an interesting question. Would a 38-year-old accident victim who had been transferred from a community hospital to the MGH "have been left to die as a hopeless case in a nearby community hospital" had he been a shoe clerk instead of an important professor? When a man driving alone is seriously injured and unconscious after an automobile accident, police and hospital authorities have only the man's wallet to learn his identity. In many cases the identification contains no information about the victim's occupation. For that reason, employees of an emergency ward – whether in a community or large city – rarely know the profession of someone brought in under such circumstances. Physicians treating the patient are even less likely to know or care about anything more than the type of accident. When a human life is threatened, the doctors hovering over the person are concerned only with saving him.

The January *MGH News* chose the case of Professor McWhorter to illustrate the type of complex care possible in a teaching hospital. Countless other examples could have been given. In fact, the majority of those considered as illustrations involved people ranging from the unemployed through those engaged in nonprofessional pursuits. Many of the patients required long-term, complicated care from a variety of specialists.

A few weeks ago, for instance, a 19-year-old stabbing victim given first aid by police was brought swiftly to the MGH Emergency Ward. The youth was unconscious and in shock. One of his main neck arteries (carotid) was 80 percent cut, and one of the main adjoining veins (jugular) was partly damaged. He had no detectable blood pressure, and his heart had stopped because of massive bleeding from the wound. By some clinical standards, he was dead. The youth arrived at midnight on a Saturday, a time when most community hospitals would have had no more than one or two physicians on duty. However, a large team of specialists at the MGH had but a few minutes to save this patient's life. Participating in the emergency phase and first few hours of his care was a broad team of residents, nurses, anesthesiologists, Emergency Ward, Operating Room and Recovery Room personnel. Their efforts had to be coordinated in minutes, a possibility available only in a large teaching hospital. The youth is recuperating and undergoing therapy at the hospital for a partial arm paralysis. He turned out to be a laborer requiring medical assistance from welfare. His care would have proven every bit as good had he been a professor.

Change of Attitudes A Goal of Project

(Continued from Page 1)

hospitals, mental health clinics attached to courts, social service within schools, schools of social work, and industrial nursing. Miss Farrisey said that most, but not all, of the nurse-participants would be nurses with psychiatric or community nursing background. Other relevant work backgrounds placing the nurse in contact with alcoholics will also be considered.

After an intense program, these people will return to their jobs, and hopefully pass on gained knowledge and perception to bring about improvements in their own agencies' treatment of alcoholics, and perhaps help create new resources.

A major part of what the program is trying to accomplish is a change of attitude in people who can influence agency practice – to reverse the feeling of hopelessness in dealing with alcoholics by providing knowledge and experience. More know-how will hopefully increase interest in providing services.

The experiment is unique in several ways, Miss Mary Waring, the Social

---

Letter to the Editor

I was moved by the story of Professor McWhorter's recovery in the January, 1971, issue of the *MGH News*. Certainly the care he received in your hospital testifies to the patience and dedication of staff personnel on all levels. Such a story can justly make you proud.

But one question about this case bothers me. Suppose the 38-year-old man in that Route 2 traffic accident had been a sailor, a shoe clerk, or a schoolteacher. Would this man have been left to die as a hopeless case in a nearby community hospital? Or would he, like Professor McWhorter, Director of the Solid State Division of MIT's Lincoln Lab, also be rushed into emergency surgery at MGH?

(Mrs.) Jill A. Lion
Haddonfield, N. J.

(Editor's Note: The reply appears in an editorial on this page.)

Work Coordinator and Planner for the program, explained.

It will include both a graduate seminar model and practical experience in clinics and community agencies. The only similar program – a three-week summer project at Rutgers Center for Alcoholism – takes place entirely in the classroom.

In the new project, the participants will meet each morning with Miss Waring, Miss Elaine Cohen, the Nursing Coordinator, and an expert in some aspect of alcoholism. After the latter's lecture, the group will spend about two hours discussing his topic.

Some of the general areas to be studied include biochemical and physiological theories and the effect of alcohol, psychological theories, treatment approaches, legal aspects, preventive approaches, community health approaches, administration and ways to make changes.

Experts in the Field

Some of the lecturers will be Dr. Morris Chafetz, Acting Director, Division of Alcohol Abuse and Alcoholism, National Institute of Mental Health, and formerly head of the MGH's Alcohol Clinic; Edward Blacker, Ph.D., Director, Division of Alcoholism, Massachusetts Department of Public Health; Edith Lisansky-Gomberg, Ph.D., lecturer in psychology, University of Puerto Rico; Mark McGrath, M.S.W., Director of Social Service, Massachusetts Department of Mental Health; Howard Blane, Ph.D., Director of Research, Research and Training Center in Vocational Rehabilitation, School of Education, University of Pittsburgh; and Vera Lindbeck, M.S.W., Assistant Director of Casework, Family Service of the Cincinnati Area.

During afternoons nurses and social workers will be paired as teams for community and clinical experience. This aspect of the program is also unusual, Miss Waring said. Nurses and social workers make a logical team to serve the alcoholic's medical and social needs. However, they do not usually work so closely.

Clinics and Communities

As teams under the clinical direction of Dr. John Renner and others in Psychiatry I and II Clinics (formerly known as the Acute Psychiatric Service and the Alcohol Clinic), the participants will see several patients or families in those clinics for diagnosis, evaluation, and planning programs of treatment.

The teams will also visit community agencies, such as a juvenile court clinic, a multiservice center in a black community, a visiting nurse association, a family agency, and a reformatory for women.

"To understand fully the aspects of alcoholism and the sociocultural milieus in which alcoholism develops or is controlled," Miss Clark said, "everyone will visit a public chronic hospital, a private hospital, a jail, an overnight station, a halfway house, and a drop-in center.

Cultural Values

"Through on-site interviewing of bartenders and proprietors, and by walking or riding with police in three contrasting milieus – an inner-city slum inhabited by a mixed ethnic group, an outer-city area inhabited by working-class Irish, and a middle-class outer-city suburb – everyone will observe and probe drinking practices and cultural values held about alcohol use and drinking behavior."

Each nurse-social worker team will be tutored and helped to plan their experiences by members of the psychiatric, nursing and social work staffs, including Clinical Assistants for the program Jeannette LeBombard, Casework Supervisor for the MGH's Psychiatric Clinics, and Patricia Stevenson, Psychiatric Nurse-Clinician.

To help the trainees, who will come from all over the country, to get acquainted with each other, and to begin working as a group and focusing on issues, a group-awareness experience is planned for the second weekend of the program.

The participants will spend two days together in residence on Cape Cod at a workshop to be led by Norman Berkowitz, Ph.D., of Boston College, and Sherwin Feinhandler, Ph.D., of Harvard Medical School. Both have been trained by the National Training Laboratories.

Awareness Workshop

The experience is designed to focus the trainees immediately on what they want to learn from the program and each other, and on the issues of problem-solving, decision-making, planning work for others, interdisciplinary role conflict, and possible resolution.

A similar workshop is planned at the end of the two months to see what the group recalls of theory and has learned from the experience, to take back to apply to their own agencies.

The concept of the training program grew out of the two-year course directed by Dr. Chafetz before he went to the National Institute of Mental Health. The previous course was a year long, and included physicians, psychologists, nurses, social workers and preprofessionals. Out of modifications of that program, addition of the seminar concept and the community involvement, the new program developed.

Miss Elaine Cohen and Miss Mary Waring discuss plans for the training program which will start next month.

Psychiatry and the Psychologically Normal Patient

(Continued from Page 1)

X-rayed at a West Coast hospital in search of the reason for his cough. The X ray "confirmed" lung cancer.

As months passed, the man lost weight; his cough worsened; he developed the type of pain that comes from spreading cancer; and he prepared psychologically to die. At the advice of another doctor, a more complete series of chest X rays was made which showed he had neither cancer nor any serious illness. Cheered by this new knowledge, he regained his former weight, and his pain disappeared.

"It probably isn't fair to call it a hex instead of a misdiagnosis," Dr. Hackett said, "but in fact that is what it is.

Death Will Follow

"The victim of voodoo firmly believes that when a witch doctor singles him out and, as in the case of Australian aborigines, points a bone at him, death will soon follow. A grave is dug for him, and the people, even his closest relatives, treat him as though he were dead. And he does die."

A less exotic version of a hex is called the "anniversary reaction" by MGH psychiatrists.

"We have seen it in the last five or six years in examining coronary patients," Dr. Hackett said. "It occurs in a person who has lost a close relative from coronary disease at a comparatively young age, say 60 or 65.

"When the survivor reaches about the same age, he begins to worry about being struck down with a myocardial infarction, and not infrequently he, too, will have a heart attack." Whether the cause is hereditary, psychological, or both, no one knows.

"But it is certainly true," Dr. Hackett said, "that more physicians have come to agree that there is a very definite relationship between emotional factors and the onset of the actual disease.

"We know through some studies done in New York, for example, that the common head cold is found far more frequently in individuals who have had a recent upset. It may be a failed exam or a broken engagement, but there is usually something that upsets the individual's emotional economy just before the infection starts."

Studies also indicate that women who have been recently widowed are more likely than others in the same age group to develop various types of cancer. Dr. George L. Engel of the University of Rochester has collected a number of examples suggesting that a person is most likely to plunge from a state of good health to illness or death during certain depressed, "hopeless" episodes (March, 1970, *MGH News*).

Stress and Disease

Medical advocates of this theory do not claim that the mental state by itself causes disease. They believe, however, that extreme depression may somehow trigger an illness for which there is already a physical basis. Thus, a disease-causing virus might lie harmlessly in a man's body for years, only to be triggered by depression or stress.

Stress itself can clearly aggravate, if not cause, some disease states. Long periods of stress produce tissue breakdown and can lead to conditions like peptic ulcers.

Potentially helpful might be some means of predicting who will develop a disease. From long-term studies in coronary care units, Drs. Hackett and Ned H. Cassem believe that it is possible to develop an index of survival on the basis of how the patient responds to stress.

This would enable physicians to foretell which patients will do poorly during their stay and after discharge. Heart specialists and psychiatrists might then devise special methods of managing such individuals.

One dramatic predictive study in recent years took place in Chicago. Researchers demonstrated the importance of depression in patients about to have cardiac surgery.

People with clearly observable depression turned out to have a very poor chance of surviving the surgery. Heart surgeons were so impressed by the findings that they required a psychiatric screening before surgery was permitted. Those patients found to be severely depressed were treated, and if the therapy was successful, their mortality rate following surgery fell to within the normal range.

Severe Cases

One reason that psychiatrists find themselves in increasing demand to assist surgical patients is the growing popularity and success of the intensive care unit. Dr. W. Gerald Austen, Chief of Surgical Services at the MGH, said:

"We are now able to perform such complicated kinds of lifesaving techniques that many of the surgical patients are quite ill for a short period of time after surgery. Because of the severity of the cases, these patients are somewhat more likely to have psychological problems while in the intensive care units. For those who do, we ask for psychiatric help."

Such help usually begins before surgery. A number of years ago Drs. Weisman and Hackett worked with patients who had cataracts removed. When these

"The victim of voodoo firmly believes that when a witch doctor singles him out . . . death will soon follow."

patients awoke from surgery, black patches covered their eyes. Many, particularly the elderly, became delirious.

Bouquet of Flowers

"If we were called in then to see them after the delirium started," Dr. Hackett said, "we were among a large number of individuals, all of whom were strangers, and it was very hard to make contact with them. We learned it was important to establish a relationship with them before the operation.

"Since they wouldn't be able to see us after surgery because of eye patches, we made it a point to establish our identity in a nonvisual way. Sometimes we brought a bouquet of flowers during the preoperative visit and had a similar bouquet when we next visited after surgery.

"In the confusion of their delirium they often did not recall our name, but the scent of the flowers always did the trick. They would recall the preoperative visit and remember that we had predicted they would get confused when they came out of anesthesia. Then we went on to reorient them and usually managed to avert a major delirium. That little link with reality provided by the nose was very helpful."

Pain and Emotions

Another problem with which the psychiatrist is often asked to help is in the evaluation and treatment of pain.

Any type of pain is influenced by the emotions. Apprehension or sadness can make it much worse, whereas elation or good news can reduce discomfort.

"Many psychotropic [mind-affecting] drugs are useful in the treatment of pain as is hypnosis," Dr. Hackett said. He considers psychiatric evaluation desirable in long-standing and perplexing pain cases.

One very important area involves psychological care for dying patients. Led by Dr. Weisman, an entire program called Project Omega (June-August, 1970, *MGH News*) has been investigating the special problems of these people.

Dr. Leon Eisenberg, Chief of Psychiatry at the MGH, summed up these many new areas in which a bridge is forming between psychiatry and other branches of medicine:

Two-Way Traffic

"Astute physicians have long recognized the interrelation between feeling and being. The development of elegant psychophysiologic and endocrine techniques in recent years has enabled us to identify – and thus to alter – the linking mechanisms.

INTENSIVE CARE UNIT

Intensive care units . . . a "severity of cases."

"Hormone output, urine flow, heart rate, and even brain waves have been shown to be subject to psychologic influences. No less significant is the growing awareness that states of feeling can be generated biologically, as in inborn errors of metabolism, endocrine tumors and toxic states.

"Bridges can, and should, carry traffic both ways. Psychiatrists are being taught by their medical and surgical colleagues even as they teach. If we are to do justice to our patients, we cannot permit our vision to be curtailed by specialization. The center of our concerns must be the human condition."

Her Lips Poured Out A Torrent of French

(Continued from Page 8)

of mind – exists. The majority of scientists, however, are less concerned about defending its existence than in determining the uses to which it can be put.

One thing that physicians agree on is that hypnosis in the hands of an amateur can be a frightening experience for both the hypnotist and his subject. "It is not without risk," Dr. Hackett said.

"The ability to be easily hypnotized is possessed by about one out of four people in this country. It is almost impossible to predict who will be a good subject on the basis of personality characteristics. Women are no better than men; suggestible people no better than nonsuggestible people. The only sure way to find out is to undergo trance induction. By and large it is safe to say that a person can't be hypnotized against his will, and that he can't be coerced into performing criminal acts while hypnotized."

Yet some strange events occur under hypnosis. A very susceptible person will raise a blister if he is touched with a pencil which under hypnosis has been described as a hot poker.

Medically, warts have been removed by hypnotic suggestion.

One amazing study involved a reaction (Mantoux) used in testing for tuberculosis. In the test, a purified protein substance (P.P.D.) is inoculated between layers of the skin. For some people called Mantoux positives, a firm, raised swelling results.

A British scientist has managed to prevent this reaction by suggesting to such persons under deep hypnosis that the injection would not cause the usual reaction. No swelling resulted in these cases, and a biopsy or study of the fluid from the injection site confirmed this Mantoux negative result.

The effectiveness of hypnosis in a good subject is sometimes startling. It is not unusual for beginners to be both mystified and mistrustful of it.

Thus, the first time a surgeon-hypnotist produced hand anesthesia to allow a cut to be stitched, he had to steel himself to begin the sewing, fully expecting the patient to start shrieking. The fact that the patient didn't utter a sound and fell asleep during the procedure seemed more like a piece of good luck to the surgeon than a normal result of hypnosis.

In another instance a physician hypnotized himself to undergo a series of tooth extractions. The dentist agreed to use no anesthetic, but the procedure was so totally painless the physician was convinced the dentist had betrayed him and slipped in a local anesthetic with a very fine needle.

When the next extraction was scheduled, the physician insisted his wife be present to prevent suspected trickery. Only in this way was he convinced that self-hypnosis was solely responsible for the painless extractions.

Flexibility of Care In Recovery Room

(Editor's Note: One of the least-known areas of a hospital is the recovery room.

The patient usually sleeps through his stay there. When he does wake up, he is often still too groggy or ill to allow him to remember having been there.

And unlike the operating room where the patient is also asleep, the recovery room remains a place rarely depicted in television stories or in the movies.

What then is a recovery room like? The following is a description.)

Monitoring vital signs of patients awaking from anesthesia is one function of Recovery Room nurses. Ruth Manns, RN, checks a patient's blood pressure.

Ten patients on respirators, cardiac monitors, blood pressure tracings displayed on screens, two or three intravenous solutions per patient.

The scene? The Recovery Room on the third floor of the MGH's White Building.

In many ways the forerunner of the intensive care units, the White Recovery Room has been the place where critical postoperative management techniques have developed at the MGH. Almost every postsurgical patient (except those who have undergone open-heart surgery) stops at the Recovery Room immediately following his operation.

The length of stay ranges from an hour or two, if he is waking up from the anesthesia of a relatively simple operation, to several days if he is critically ill and requires intensive care.

As operative procedures have become more complex and as sicker patients have been considered for surgery, the character of the recovery room has undergone continual change. Postoperative cardiac surgical patients were the first who stayed for long periods. The logical extension to the other critically ill surgical patients soon followed.

The Recovery Room nurses are skilled in the care of all types of surgical patients.

Recovery from anesthesia (checking vital signs – pulse, temperature, blood pressure, respiration) became only one of the functions of the Recovery Room. In addition, patients requiring extensive monitoring, nursing or "doctoring," soon became familiar members of the patient population, now totalling 12 percent of the approximately 1,500 admitted to the Recovery Room each month.

Extensive Monitoring

All those who have undergone major surgery benefit from being extensively monitored for a longer time in a central location with critical care facilities and staff. For instance, vascular (blood vessel), surgical and neurosurgical patients are routinely kept overnight.

Also, patients who, due to the extent of surgery or complications, require much monitoring and many intensive nursing procedures, remain in the Recovery Room.

There are also the truly critically ill, who require repeated and sustained physician intervention.

The Recovery Room census of these types of acutely ill patients averages seven a day with a 7 a.m. census (reflecting the number of overnight patients) as high as 15.

Of these patients, some remain until a bed becomes available in another special care area, while others stay until their conditions have improved enough to return to the floors.

Many heads together provide comprehensive care in the Recovery Room.

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"An ever-increasing number," Dr. Joseph Gabel, the anesthetist in charge of the Recovery Room, noted, "stay in the Recovery Room for the entire course of their critical illness."

He and Dr. Joseph Civetta of the Surgical ICU form a team whose primary interest is the coordinated care of the critically ill patient.

Specific training in critical care medicine has become an increasingly important segment of training programs in both surgery and anesthesia. Now, as a part of their training, all anesthesia residents rotate through the Recovery Room for a month.

Mrs. Mary Lou Wildasin, Nursing Supervisor, and Miss Julia Delafono, Head Nurse of the Recovery Room, manage the task of providing the enormously flexible response required of Recovery Room nurses.

Testing Ground

The 40 nurses who staff the area are trained in the care of the acutely ill. Theirs is very similar to nursing training in ICUs, because recovery room nurses deliver much of the same type of care.

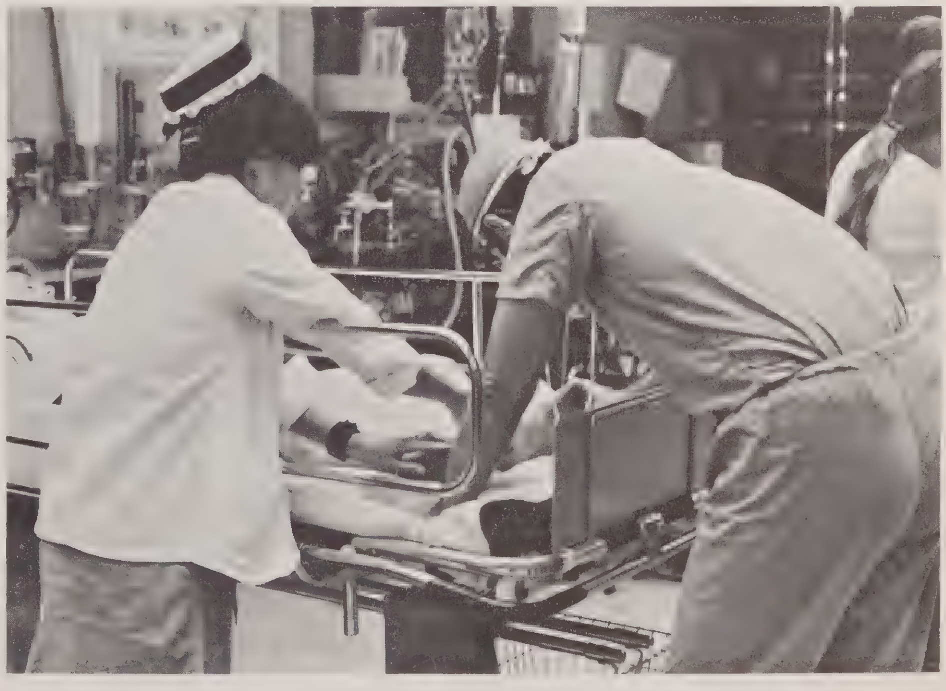
Indeed, many of the intensive care techniques have developed in the Recovery Room. It is often the testing ground for a new monitoring or nursing technique that later spreads to other patient care areas. The use of arterial lines to monitor blood gas and blood pressure is an example. It is now commonly used in the Recovery Room, but when it appears on other floors, a special nurse is required to watch it.

All Types of Patients

"The nurses are as flexible as the room itself," Mrs. Wildasin said. "The Recovery Room never closes its doors, and these girls will always take one more patient and give all the best possible care.

"They are a sharp, cohesive group, skilled in the care of all types of surgical patients. They must know about all types of disease processes and surgical problems. They keep up on the latest techniques and procedures.

"I really feel fortunate to have such a great group to work with," she added. "These girls do a terrific job – no load is too great. They deliver excellent care sometimes under overwhelming odds."



Dr. Robert Sloane examines patient assisted by Donna Fulchino, RN.

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A Torrent of French Tumbled From Her Lips

Using hypnosis as a tool, the psychiatrist was demonstrating how to make patients regress to an earlier age.

The 20-year-old nurse remembered in detail her 13th birthday, her 12th, etc. Her voice became increasingly childlike as she relived each birthday. When she reached nine, a torrent of beautifully pronounced French tumbled from her lips.

Awakened from her hypnotic trance, the nurse was astonished when she learned of her fluent French.

"When I was very young," she recalled, "my father was an Air Force officer on duty in France for two or three years. I know that during that time I learned a few words of French. I had no idea I spoke more than a few words or that my accent was anything but bad American."

The demonstration with that unexpected twist took place when Dr. Thomas P. Hackett was showing fellow MGH psychiatrists some of the ways they can use hypnosis to treat patients.

He described in an interview several of the increasing uses of hypnosis for treating psychologically normal persons. The very nurse who spoke fluent French at age 9 is an example.

With the aid of hypnosis she underwent without discomfort a rather painful X-ray procedure that normally demands medication. After she had an operation, additional hypnosis relieved much of her pain or uncomfortable symptoms.

Physicians occasionally use hypnosis instead of an anesthetic for major surgery. More commonly, psychiatrists hypnotize patients to relieve pain.

"We have had a course on hypnosis that has been incorporated in our Consultation Service's training program for the last six years," Dr. Hackett said. "We teach medical hypnosis. Some medical students take it as an elective, and all of our psychiatric residents take it. A number of anesthetists and some surgeons have taken it, as well as some internists.

Increasing uses are made of hypnosis for treating psychologically normal persons. Here, Dr. Thomas P. Hackett demonstrates a technique employed in hypnosis.

"For patients who are good hypnotic subjects, hypnosis is an excellent way of managing discomfort and pain, and it's a simple and relatively harmless procedure.

"Not everyone is a good subject for hypnosis," Dr. Hackett emphasized, "and even if a given person is, pain isn't always relieved."

He, like other medical hypnotists, has used the procedure to help people give up smoking, but only in carefully selected cases.

"If someone comes in and says he has been thinking about giving up cigarettes and would like me to hypnotize him," he said, "he usually expects a magical cure – painless and easy. I will tell him that there is no magic, and I can't make him stop unless he really wants to. He has to be sufficiently motivated."

If someone is afflicted with an ailment resulting from smoking, such as emphysema or coronary disease, he obviously is more likely to have a stronger desire to stop than a smoker without symptoms. Usually the cure rate is higher in these individuals, but the key factor still depends upon whether or not they are good subjects.

Although hypnosis has an ancient history, the phenomenon failed to gain scientific attention until a Viennese physician, Dr. Franz A. Mesmer, began using it in the late 1700s to treat a variety of patients. However, his theory that hypnosis involved an "animal magnetism" disenchanted the medical profession for many years.

Even today the concept is shrouded in mystery. There is no adequate definition of hypnosis, nor is there very much known about its psychological and physiological aspects. Because of this dearth of information, a few even doubt that hypnosis – as a special state

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MGH News

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The Professor Is Overweight But Shows Promise

The year is 2000. A medical student hunches over a teletype machine "talking" to his professor.

The 4,000-pound teacher is so huge he takes up an entire room in another building. "He" is a computer.

Unlikely? Not really. On an experimental basis the scene already exists at the MGH.

Some institutions are using computers to teach facts. The vocabulary for a foreign language course can easily be taught this way. So can the parts of the human body in an anatomy course.

In the MGH pilot project, however, the student learns how to deal with problems. "Clinical judgment is a good term for it," said Dr. G. Octo Barnett, Director of the MGH Laboratory of Computer Science.

"We try to do with the computer what I think good teachers do when they teach problem solving. Their teaching follows a pattern of: 'Well, here's the available information. What do you think is wrong? Now what would you do next? Why would you do it that way? If you took that step, what would you expect?' "

The need for computerized medical education is growing rapidly (story on page 4). Until the present time, however, medicine has had to rely on vital contact with actual patients to teach the diagnostic and management skills involved in patient care. Professors are reportedly finding it more and more difficult to devote the increasing time required to supervise the students they must train. And supervised training is expensive and difficult to provide in sufficient volume, variety and quality.

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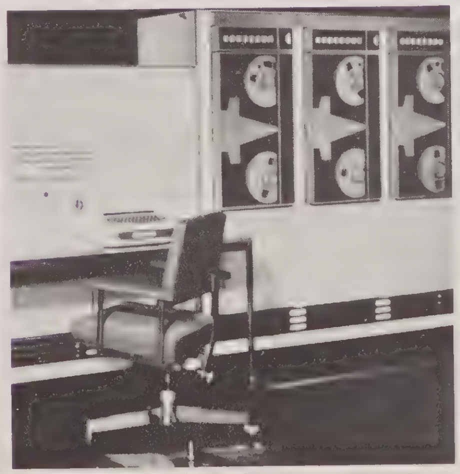

The professor.

New Program Reaches Out to Street Youth

When you're weary, feeling small,
When tears are in your eyes,
I will dry them all;
I'm on your side. When things get rough
And friends just can't be found,
Like a bridge over troubled water
I will lay me down.
When you're down and out,
When you're on the street,
When evening falls so hard
I will comfort you.
I'll take your part
When darkness comes
And pain is all around
Like a bridge over troubled water
I will lay me down.

The preceding lyrics by Paul Simon are, Dr. Andrew D. Guthrie feels, the best job description of one of the latest additions to the MGH's health-care personnel – the street workers of the Street Youth Program.

These eight people, all experienced in working with "street people," the alienated youths, more apparent and abundant on Boston streets during the summer, but very much present the rest of the year, are an integral part of the new project. They are involved in all its aspects, directed and coordinated by Jill Barnes, RN, the program's director.

Dr. Guthrie describes the group at which the program is aimed:

"For some youths, a pattern of constant or frequent failures, real or imagined, abuse, noncommunication and scholastic underachievement lead to a 'loser' attitude. Rebellion against such frustration and dissatisfaction expresses itself in escape from these tribulations to a new life of 'achievement and recognition.' In fact, some do not run away but are cast away by their families. The runaway or castaway youths who reach the anonymity of large urban areas are particularly vulnerable to the destructive life patterns present in the subcultures that absorb them.

"These youngsters, out in society, like abused infants in families, require protection and guidance. Their eagerness to be accepted, relative immaturity, boredom and possible depression make them susceptible to drug use, sexual promiscuity, habitual theft, and even violence against society that has ignored or defeated them. The price of 'making it' on the streets may come high."

The major outreaching arm of the new program is the Free Medical Van.

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EDITORIAL:

Test Problems and a Possible Solution

Nobody seems happy with the traditional system used to evaluate patient-care competence in medicine. Medical schools, boards which license physicians to practice medicine, and specialty boards which certify them in the practice of internal medicine, for example, all find fault with the tests: the oral, too costly; the written, inadequate. Examiners find them too time consuming. Students and doctors taking the oral portions find them unfair, or unreliable, because they lack uniformity. For years everyone – in good Mark Twain fashion – has complained about the tests, but hardly anyone has done anything about them.

Now the MGH Laboratory of Computer Science and the Harvard Medical School Department of Continuing Education are in the early stages of a hoped-for solution.

Even more dramatic is the news that the Laboratory of Computer Science and the Department of Continuing Education are cooperating in a venture to produce computerized training for many of the skills needed in providing patient care.

No doubt the old fears will be raised about producing automatons instead of doctors. Indeed this is a possibility to be guarded against. But the individuals responsible for creating such new training systems recognize the limitations as well as the capabilities of the computer. With this in mind, they are carefully circumscribing the uses for computerized education. They are making the computer a supplement, not a replacement, to the experience of seeing patients. But there are many areas in problem solving where the computer may prove an ideal educational tool. The computer shares a number of advantages with the textbook in that both can be made simultaneously available to many different students in many different medical schools. And yet the computer also shares many of the advantages of a good teacher in that it can interact directly with a student, at his pace, on problems of his selection.

With such new and individualized courses a possibility, the "classroom" of the future may assume a markedly different appearance. The computer may come to play an equal role with the three classical educational resources of the medical school: the patient, the teacher, and the medical literature.

Overweight Professor Shows Promise

(Continued from Page 1)

On the other hand, unsupervised care given by inexperienced students would be dangerous for the patient (and illegal).

There are increasing pressures already being placed on clinical teaching by changing medical school requirements. The national trend has been to expand the class size of the medical school and the amount of patient-care experience required. At many teaching hospitals this altered emphasis has strained existing programs which provide such experience.

"As class sizes increase," Dr. Barnett said, "it will be hard to make it possible for every student to have personal responsibility for the diagnosis and treatment of every significant type of disease entity. There is a danger medical education could rely too strongly on lectures and textbooks at the expense of the personal involvement of the student in individual problem solving."

The Air Force once faced a similar dilemma in training pilots to fly. The Link trainer solved that problem by simulating flight right on earth.

Dr. Barnett and Mrs. Barbara Farquhar, of the Laboratory of Computer Science, and Dr. Daniel D. Federman, Associate Dean for Continuing Education at Harvard Medical School, are trying to turn the computer into a Link trainer of medicine.

"There are elements of medicine that cannot be taught this way," Dr. Barnett said. "The computer can't teach the student how to feel for the size of the liver, or how to listen to heart sounds. Training such as this requires experience with real patients. In addition, there are certainly vital elements of knowing how to relate to people, of knowing how to interact with another human being and accept responsibility for his care. These can only be taught in a patient-care situation under the wise counsel of another physician.

"But much of medicine is a relatively high-level intellectual activity; a cognitive process of problem solving. To the extent that the activity can be identified and simulated on a computer system, it can indeed be taught, and I think in a fairly effective fashion."

Dr. Barnett cites important reasons for this. The computer "patient," for example, can be tailored to fit the individual user. A novice gets a relatively easy case. Someone who is more experienced or who has completed the program several times receives a case with a number of complications.

Like actual patients, the simulated ones respond in different ways to treatment. Finding different responses brings this fact home to any student who tries his hand at several cases. The computer is programmed to set up these varied responses with the same frequency as occurs with real patients.

Dr. Barnett's group is trying out several of these programs with "very promising" early results. One program, written by Dr. Edward Hoffer, an assistant MGH medical resident, teaches the student the appropriate techniques to revive patients whose hearts have stopped beating. The ability of the physician to select the correct course of action, called cardiopulmonary resuscitation, is vital since the doctor has but seconds to begin the proper treatment.

"You don't have time to go to the library," Dr. Barnett said, "to see what to do in a situation like this.

"The physician has to be trained to the point that he chooses the appropriate steps from habit. Yet even many experienced physicians see a patient in this condition on but rare occasions – not anywhere often enough to produce proper habit patterns."

The Laboratory of Computer Science has devised a refresher course aimed at overcoming this handicap. About 75 people have taken part in this computer experience, and the reaction has proved encouraging. Medical students, interns, residents, nurses and practicing physicians have participated and have expressed enthusiasm.

"They get highly involved with the computer system," Dr. Barnett said. "As an educational activity, it seems to have a very high degree of realism."

The user realizes that the patient presented by the computer is not real. But sometimes the learner becomes so absorbed in managing the medical problems that he acts as though it were a real patient.

Such was the case recently when a practicing physician was taking the cardiopulmonary resuscitation sequence. He was told that the computer had to be turned off for 10 minutes for a routine procedure. The physician objected angrily, "I've got to finish first. This patient is in serious condition."

Another type of computer program teaches the student how to select the best possible strategy in diagnosing a patient's condition. Ordinarily the student is expected to acquire this skill through an apprenticeship training, by observing and trying to copy the approach used by his instructors.

Dr. Barnett, John Baillieul, Senior Programmer in the Laboratory of Computer Science, and a group of MGH medical co-workers have developed sequences in which the computer becomes the patient, and the student attempts the correct diagnosis. In one, for example, the computer takes the part of a 45-year-old woman with abdominal pains.

The student asks about specific additional signs and symptoms and "orders" tests. He has to decide which test is the best one to seek next, and when he has enough information to diagnose and begin treatment. In turn, the computer rates his performance. This evaluation is based on the efficiency with which the student seeks the information and orders the tests, and the accuracy with which the student interprets the information and makes the diagnosis.

Methods of evaluating how well a supervised student performs these tasks with a real patient have never been standardized. Evaluation "depends strongly on the bias of the instructor," Dr. Barnett said. Therefore he decided to compare computer and teacher ratings.

Medical students in their principal clinical year were asked to "work up" these "cases" on the computer.

Dr. Barnett's group compared the resulting computer scores with those the 19 participating students received from their instructors for problem solving in actual patient-care settings. Computer and instructor grades were close.

"It looks as if we may have a reasonably good approximation for measuring that poorly defined skill that we call clinical judgment," Dr. Barnett said. "It's going to take more development and experimentation, but we may well have a tool that we can use to identify and to give special instruction to those individuals who are not doing well in regard to clinical judgment. They would be able to learn by experimenting over and over again on the computer system."

Medical students, interns and residents, and a group called clinical fellows are developing content and strategies for additional computer-based teaching programs. Those already prepared include one on the appropriate choice of antibiotics for a urinary tract infection, the proper ordering of a drug to decrease the clotting of the blood, the "differential diagnosis" of a patient with a bleeding disorder, the diagnosis and treatment of an unconscious pa-

(Concluded on Page 4)

The student.

Doctors May Have to Pass Computer Test

Physicians may one day have to pass a computerized test before they can be licensed to practice medicine.

The MGH Laboratory of Computer Science and the Harvard Medical School Department of Continuing Education are already investigating the possibility. They have devised a prototype examination in cooperation with the National Board of Medical Examiners. In granting licenses to practice medicine, most states, including Massachusetts, accept the results of the National Board's current test.

The Board has become concerned about the limitations of both oral and written portions of present medical testing in general. The orals have run into disfavor on two grounds: they are expensive to administer and lack uniformity. The complaint about the written section is that it fails to test patient-care capabilities in a realistic way.

Current computer testing now being refined strives for exams which can be scored objectively. As with other medical education techniques devised by the MGH Laboratory of Computer Science, problem solving, rather than recall of facts, is emphasized.

Students and residents at six medical schools and hospitals in Boston and Philadelphia have taken this prototype computer-based exam. The initial results appear promising as to both validity and acceptability. The examinees expressed a strong preference for the computer-based test over a written one.

This prototype examination was developed as a joint effort by the Laboratory of Computer Science (Dr. G. Octo Barnett, Director of the Laboratory; Mrs. Barbara Farquhar, Assistant Director of the Laboratory; and John Baillieul, Senior Programmer), and the Department of Continuing Education (Dr. Stephen E. Goldfinger, Director of Community Programs for the Harvard Medical School Department of Continuing Education; and Dr. James J. Dineen, a Fellow in that department).

The Laboratory of Computer Science in cooperation with the National Board is also devising models of computerized tests that may be used for certifying doctors by specialty boards.

Each specialty group, such as anesthesiology, has a national organization that certifies candidates who meet its requirements.

One of these, the American Board of Internal Medicine, is working with the National Board and the Laboratory of Computer Science, to develop specifically a computerized test to certify specialists in its area. The Commonwealth Fund and the Carnegie Corporation, two philanthropic foundations, have provided grants for this development.

Computer examinations could become important for other compelling reasons. One is the likelihood that physicians of the future will have to be recertified in their specialties every given number of years. Unless computer-based examinations are developed, the resulting workload for the boards would be intolerable.

The anticipated increase in medical school enrollments would cause similar pressure for both teaching and testing by computer.

"The resources of medical education are already overextended, and many house-staff [residents and interns] training programs are felt to be inadequate as educational activities," Dr. Barnett said. "The evaluation of the medical competence of these embryonic physicians is a critical aspect of the post-doctoral training, both to identify areas of relative weakness for the individual student, and to help the faculty better plan the formal educational program.

"Computer-based testing may play a very important role as a resource to measure problem-solving skills and clinical judgment and as a stimulus to improve the training experience."

Overweight Professor Shows Promise

(Continued from Page 3)

tient, and the emergency care of a poison victim. Dr. Barnett believes that his Laboratory can work up an almost limitless variety of such programs.

He and Dr. Federman in his capacity as Assistant Chief of the MGH Medical Services visualize two ways of using these computerized systems.

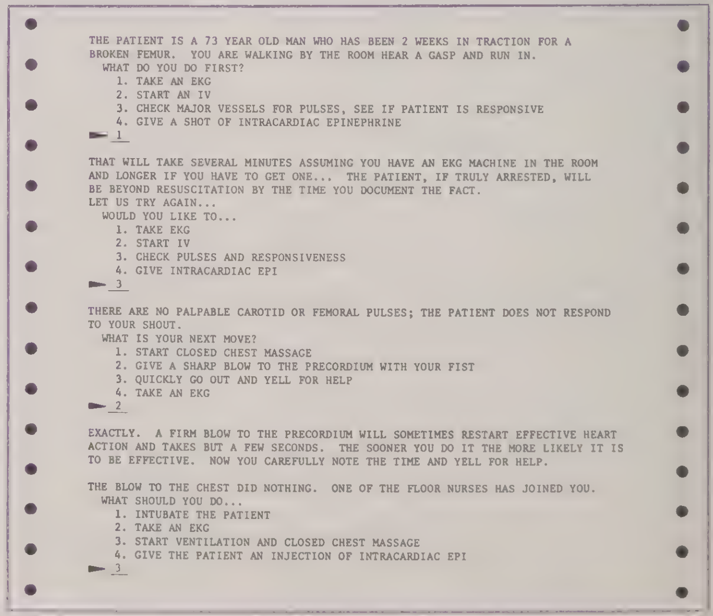
One would be informal: Computer terminals at different parts of the hospital would permit any physician, nurse or medical student to use the facilities whenever they want.

In the other, Harvard Medical School students would use them as part of specific courses.

"You can envision a time coming," Dr. Barnett said, "when you would first have to show that you could adequately treat a simulated patient by means of the computer system before you are allowed to write orders on real patients. In this sense the computer could be used as both a teacher and an evaluator of an individual's ability to deal with a real clinical situation.

"One of the best ways to learn is to go through a situation in which you are involved and make the wrong decision.

"Obviously we can't let that happen with a patient, but we can with the computer. If something dire happens to the computer 'patient,' the student making the mistake will long remember his error, and hopefully will never repeat it on a real patient."



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THE PATIENT IS A 73 YEAR OLD MAN WHO HAS BEEN 2 WEEKS IN TRACTION FOR A
BROKEN FEMUR.  YOU ARE WALKING BY THE ROOM HEAR A GASP AND RUN IN.
  WHAT DO YOU DO FIRST?
    1. TAKE AN EKG
    2. START AN IV
    3. CHECK MAJOR VESSELS FOR PULSES, SEE IF PATIENT IS RESPONSIVE
    4. GIVE A SHOT OF INTRACARDIAC EPINEPHRINE
► 1

THAT WILL TAKE SEVERAL MINUTES ASSUMING YOU HAVE AN EKG MACHINE IN THE ROOM
AND LONGER IF YOU HAVE TO GET ONE...  THE PATIENT, IF TRULY ARRESTED, WILL
BE BEYOND RESUSCITATION BY THE TIME YOU DOCUMENT THE FACT.
LET US TRY AGAIN...
  WOULD YOU LIKE TO...
    1. TAKE EKG
    2. START IV
    3. CHECK PULSES AND RESPONSIVENESS
    4. GIVE INTRACARDIAC EPI
► 3

THERE ARE NO PALPABLE CAROTID OR FEMORAL PULSES; THE PATIENT DOES NOT RESPOND
TO YOUR SHOUT.
  WHAT IS YOUR NEXT MOVE?
    1. START CLOSED CHEST MASSAGE
    2. GIVE A SHARP BLOW TO THE PRECORDIUM WITH YOUR FIST
    3. QUICKLY GO OUT AND YELL FOR HELP
    4. TAKE AN EKG
► 2

EXACTLY.  A FIRM BLOW TO THE PRECORDIUM WILL SOMETIMES RESTART EFFECTIVE HEART
ACTION AND TAKES BUT A FEW SECONDS.  THE SOONER YOU DO IT THE MORE LIKELY IT IS
TO BE EFFECTIVE.  NOW YOU CAREFULLY NOTE THE TIME AND YELL FOR HELP.

THE BLOW TO THE CHEST DID NOTHING.  ONE OF THE FLOOR NURSES HAS JOINED YOU.
  WHAT SHOULD YOU DO...
    1. INTUBATE THE PATIENT
    2. TAKE AN EKG
    3. START VENTILATION AND CLOSED CHEST MASSAGE
    4. GIVE THE PATIENT AN INJECTION OF INTRACARDIAC EPI
► 3
```

Computer printout shows a portion of "conversation" between medical student and "professor."

New Program Reaches Out to Street Youth

(Continued from Page 1)

The unusual vehicle has a prior history of its own but has been linked to the MGH project. Its activities are under the guidance of Dr. Guthrie, who is one of the three physician-supervisors of the program, and also the Director of the Ambulatory Division of the MGH's Children's Service.

The van grew last spring out of the multiservice Bridge Over Troubled Waters, an organization of people concerned about the estimated 50,000 adolescents and young adults, 12 to 25, on the streets of Boston last summer. (Dr. Guthrie was one of the founders of the group and is still a director.) Among the services established for the street people was the mobile medical unit staffed by volunteer physicians, residents and interns from the MGH, Boston Floating Hospital, Children's Hospital, Veterans Administration Hospital, University Hospital, Boston City Hospital and private practice, along with volunteer nurses, medical students, dentists and dental students, guidance counselors and street workers.

The van, still staffed by volunteers, operates much as it did before being linked to the MGH program, only now with the program's grant from the Massachusetts Department of Mental Health, it can offer services and follow-up not possible before.

Dr. Guthrie explained that the initial aims of the van were to demonstrate interest in these youngsters and listen to what they were saying. This was attempted through offering medical services, primarily to treat minor complaints. Now referral for more serious problems is possible. It was hoped that this would direct the youths toward reestablishing communication with the "establishment," and perhaps ultimately help "bridge" the cultural gap between the street youth and the establishment by resolving difficulties encountered at traditional institutions like hospitals. Additionally, it was hoped that channels of communication might be developed between the adolescents and their families, at their request.

The original vehicle was donated for the summer months by the Massachusetts Medical Association's women's auxiliary, who use it during the school months for traveling displays to recruit for medical careers. The present vehicle is owned by Bridge Over Troubled Waters.

The van is equipped with two counters which serve as examining tables, curtains to afford some privacy, locked cabinets for supplies, and a microscope for simple laboratory tests.

Supplies are donated by privately owned pharmacies, pharmaceutical houses, and the MGH pharmacy, and purchased with the program's funds. They include cough syrups, vitamins, ear and eye drops and ointments, aspirin, antibiotics, dressings and a supply of emergency drugs. The Massachusetts Department of Public Health provides penicillin for intramuscular use (as in the treatment of gonorrhea), and throat-culture sets.

With a normal staff of one physician, two or three nurses, one medical student, a driver, and a street worker from Bridge, the unit makes five stops a night. It follows a regular route which varies each evening of the week, just as the team varies slightly every night, sometimes including a dentist, a dietitian, and other specialists. The unit stops every trip at Project Place, Kenmore Square, Sanctuary, Harvard Square, and in the warmer months, Boston Common and Cambridge Common. On some nights visits are also made at the Old West Church, the Hare Krishna Temple, the Arlington Street Church, and Project Turnabout.

The group encountered by the van personnel, Dr. Guthrie notes, is "marked by contrasts: young, lost, frightened castaways; 'losers,' 'heads,' and 'freaks'; intellectuals and pseudointellectuals; dropouts and college students; aggressors and negative, passive youths; conscientious objectors; homosexuals; the sexually promiscuous; and revolutionaries. Despite these contrasts, there was a unity in spirit associated with uninhibited demonstration of concern, affection and love for one another. An insult to one was an insult to all, and special care given to one was appreciated by all.

"When medical problems do arise among these youths, contact can only be established on their terms. Reasons for youths receiving no medical care, or treatment only after a long delay, are obvious by the nature of their age, their runaway or drug-use status, and their fear of being 'busted,' or recognized and returned home. The basic social, medical and psychologic problems that have led to their alienation are frequently complicated by the additional burdens of their street existence – lack of funds, inadequate diet, poor personal hygiene, venereal disease, unwanted pregnancies and drug abuse."

With the link to the MGH program, follow-up services can now be offered at MGH clinics. Miss Barnes noted that during February, approximately 500 patients were seen on the van, the number treated in an evening ranging from 20 to 50. Of these, about 60

(Concluded on Page 6)

Street workers form the core of the program, on and off the van.

New Program Reaches Out to Street Youth

(Continued from Page 5)

needed further treatment and were referred to the appropriate medical clinic, or the Emergency Ward or Acute Psychiatric Service (Psychiatry Clinic I) if their problems warranted. The medical care of about one-half of those referred is paid for by the project's fund.

In February, every week of operation increased the number seen and referred, and Miss Barnes expects the advent of warmer weather to swell the numbers.

When a youth is referred to the hospital clinic, he is met there by a street worker, one of whom is on duty seven days a week from 10 a.m. to 10 p.m. The street worker serves as patient-advocate, ombudsman, and guide through the unavoidable red tape and delays. He helps work out financial arrangements and assists when necessary with the common problems of food, lodging, and legal difficulties.

Another of the program's facets is available to those patients who want help of a more basic and complex type – a change in life style, return to school, finding a job, or possibly reuniting with their families. In these cases, the Family Evaluation Unit is a useful resource.

The Unit has been at the hospital since July 1970, directed by Dr. Mary C. Howell, who is another of the Street Youth Program supervisors.

If desiring this type of help, the adolescent is evaluated through psychiatric and psychological interviews, and his current and past environment are discussed. A tentative plan for his future is formulated at a diagnostic conference attended by all those involved in his case, including his street worker. The plan is then discussed with the patient.

If the adolescent wants to try to patch up his family ties, the Unit can serve as the means, with both the parents and the youth having advocates to help express their points of view.

The patient is followed and his outcome evaluated after this initial process.

For the street people over 19 who also desire major life changes, Psychiatry Clinic I will provide emergency consultation and evaluations, crisis intervention, Social Service evaluations and referral for casework, group therapy or long-term individual psychotherapy.

Janet Urman is the Social Service liaison to the program. She serves as a resource person, referring patients to appropriate community social agencies, as well as evaluating youths and working with parents.

Drug use and abuse are common in the environment in which the street people exist, and Dr. Howell explains, "All runaways are potential drug abusers." Treatment for this aspect of their lives is an important facet of the program, headed by Dr. John Renner, Coordinator of Drug and Alcohol Programs, and Assistant Director of the Adult Outpatient Psychiatric Service.

The major outreaching arm of the new program is the Free Medical Van.

Van personnel hear more of "bad trips" from LSD, or cases of OD (overdose) from heroin than they actually see on the van. Youths with these problems, or any related to drugs, are referred to Dr. Renner's program. He directs evening drop-in groups for those using drugs. These are group encounter situations, centering on drug use, but also hitting on the problems that cause the users to start in the first place.

"It's a mixed population," Dr. Renner said, "some desperate and frightened, some resistant. Diagnostically, most of the addicts in our program have severe character disorders, and other serious emotional problems. Whatever their motivation for seeking help, it is very difficult to engage them in any therapeutic program. This is an area where new techniques must be developed."

If the program is able to obtain the additional personnel needed, he hopes that street workers will be able to do more "outreach" work with the heroin addicts, particularly follow-up evaluations on those addicts who do not remain in treatment.

As part of the drug treatment, a methadone detoxification program (as opposed to methadone maintenance) is conducted for heroin addicts.

These people tend to be older than most seen on the van, Dr. Renner noted. They are usually in their late teens or early twenties. Whereas the younger runaways tend to be more disorganized and helpless, this group seems to be better able to manage their lives, perhaps hardened by several years of their habit.

Patients for Dr. Renner's area are more frequently referred to the program from the Emergency Ward or Psychiatry Clinic I than from the van.

Dr. Guthrie explained that the goal of the whole program is not duplication of services offered elsewhere for these youths, but rather supplementation and cooperation with existing services. Miss Barnes pointed out that the MGH project serves as an outreach for all these programs, and has a close working relationship with such groups as Bridge, Project Place, Project Help, Sanctuary, and Project Turnabout. The MGH group has received referrals from these, as well as other clinics at the hospital, and during February saw 100 such youths, 50 of whom are receiving follow-up medical attention, and 15 ongoing emotional care.

The Campus Here Was Pretty Quiet Until –

Dr. Gerald S. Foster, who shares an office at the MGH with Dr. Maynard (story on page 8), has replaced Dr. Maynard at Mulago General Hospital and Makerere University Medical School in Kampala, Uganda.

"I've learned to do physical examinations while on my knees," Dr. Foster reports, "because overflow patients have to lie on the floor." On Jan. 25, however, Dr. Foster's thoughts temporarily strayed from medicine. That was the day when Maj. Gen. Idi Amin's troops and tanks thundered through Kampala to wrest control from the then president, Milton Obote.

A letter from Dr. Foster to Dr. Maynard graphically recalls the coup d'etat:

"Monday, 25 Jan., dawned like any other day. The sun was rising over Kololo, and there was a magnificent mist covering the low areas of Wandegeya and the road in front of the hospital. The view from our balcony was spectacular – the difference was the sound of gunfire.

"A quick call from Bill Parson, one to the American Embassy, and a brief report on the BBC revealed only that there was a military action in Kampala during the night. Tanks and soldiers had surrounded the Parliament Building and in other areas around the city, scattered heavy firing was reported. . . .

"No one really knew who was doing what to whom – and we were not to know for eight long, somewhat anxiety-producing, rumor-filled hours. Memories of Dec. 1969 and of 1966 were still very fresh, and the entire population of this bustling city literally disappeared from sight. The campus here was pretty quiet with scattered groups of silent, anxious students – until an armored car came bustling along Pool Road, guns firing into the air, it turned out, but who could tell at the time, and in ten seconds the campus too was silent. . . .

"The Uganda radio was silent, and the hourly reports on BBC were more confusing than informative. And then around 4 p.m. radio silence was broken. After listing a long set of grievances against the previous regime, the Army announced that it had taken over the government, that Mr. Obote (who was on his way home from Singapore) was no longer in charge, and that Gen. Amin with the cooperation of the Inspector General of Police was now the head of state. . . .

"The unbelievable thing about this – and one that is hard to describe – is the popular reaction. The whole city was completely silent when the radio silence was finally broken.

"The announcement of the takeover was not even completed when one could hear chanting and cheering and drum beating slowly building up to an unbelievable crescendo. People just poured into the streets in jubilant celebration.

"Wandegeya and Bombo roundabouts and the road in between were a seething mass of humanity. Automobiles bedecked with branches and banana leaves and loaded to the gills with people drove all around town, horns blowing, with acrobatic cheering from the inhabitants. A normally six-passenger car would have nine people inside, four on the hood, three or four sitting in the open trunk, and many on the roof. . . .

"I am told by people who have been here a long time that there hasn't been anything like this since independence day 1962, but in some ways this was even more unbelievable since it was totally spontaneous. It's as if some heavy weight had been suddenly lifted from the shoulders of the populace – a sort of diuresis following relief of an obstruction. There can be no doubt of the popular support for this move. . . .

"I don't mean to imply that there aren't problems and concerns and unanswered questions and still some uneasiness. There were casualties – about seventy according to the BBC – all soldiers and some police that loyally resisted, and even some innocent, I am sure.

"Civilian casualties were almost nonexistent except for a slew of auto accidents from the celebrations. There has not been a wholesale rounding up nor beatings and killing and imprisonment of Obote men in the government. . . .

"One immediate good effect is a dramatic reduction in crime. Amin has announced that anyone molesting another or robbing or breaking the law will be dealt with severely by the Army – that has seemed to scare the Kondos.

"The military presence seems to be getting less every day – as does any chance of a countermove either from within or without. Work at the hospital and at the University seems to be returning to the usual routine again."

From Mud Huts

(Continued from Page 8)

scribed the lymphoma named after him, theorizes that the very high roughage content in the Ugandan diet may play a cleansing, preventive role with bowel cancer.

On the other hand, problems associated with the tropics and poverty abound: malnutrition, malaria, tuberculosis and parasitic diseases.

Ulcers of the duodenum (a segment of the small bowel) also turn out to be quite common in Africa. Even people living in the bush country get this ailment often thought of as a concomitant of the stressful life in a big city.

"People in the bush have stresses too," Dr. Maynard said. "Their stresses may be more basic – whether they are going to survive, or perhaps fighting with their neighbors. But their stresses are every bit as real to them as ours are to us."

Students at Makerere University graduation.

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From Mud Huts to the Practice of Medicine

Africans who have emerged from mud huts are becoming skilled physicians in Uganda, one of East Africa's new nations.

An MGH doctor spent his sabbatical there helping to educate and to bridge the cultural gap. The physician, Dr. Edwin P. Maynard, III, said: "It is an amazing phenomenon to see students who have come from an illiterate mud-hut background going first to a bush school and later working their way through secondary school into the university medical school.

"Along the way they have to learn English. But despite these handicaps, the very best of them are quite comparable to our students here."

One important difference Dr. Maynard observed is the attitude toward illness:

"The African of the bush society is surrounded by problems of enormous infant mortality and early death. As a result, he frankly accepts illness and death as being rather routine in his life.

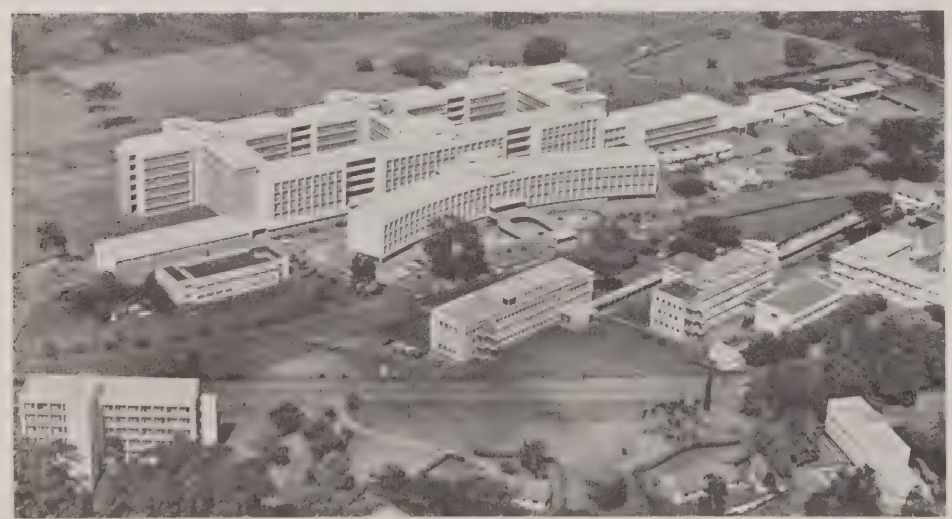
"Therefore he doesn't develop a concern for the problems of illness in others. Now this is undoubtedly a generalization that doesn't hold for every individual or every tribal group. But time and time again one is struck by the fact that there is a very casual attitude toward illness and injury.

"When there is a traffic accident, people will just walk by somebody badly injured by the side of the road and pay no attention to him. Rather than a callous attitude, this seems to represent an acceptance, or helplessness, in the face of illness or death."

Some of the medical students come from areas where such acceptance prevails, Dr. Maynard stated. Part of the task of the medical school faculty then is to instill a feeling of concern toward the patient.

The medical school in Uganda is a division of Makerere University in the capital city of Kampala. After weighing teaching opportunities in several developing countries, Dr. Maynard chose Makerere for a sabbatical year from August of 1969 to July of 1970.

Mulago General Hospital, affiliated with the medical school, is sometimes called the MGH of Kampala. The only major hospital in the country, it is a modern 900-bed structure built in 1962 as a gift of independence from the departing British. Professor William Parson, an MGH graduate, heads the Department of Medicine.



Mulago General Hospital, "the MGH of Kampala," Uganda, and the Makerere University Medical School.

"Many things are carried out there at a very sophisticated level," Dr. Maynard said. "They have, for example, a certain amount of closed cardiac [heart] surgery going on. We had a cardiac catheter laboratory in our department, and a good deal of sophisticated clinical research is carried out in many fields. There are a lot of deficiencies, however, and these are the result of shortages in trained personnel, equipment and money – especially the latter."

Dr. Maynard's duties resembled those at the MGH and Harvard Medical School: making rounds on hospital wards, supervising the care of patients on his service and teaching medical school students, residents and interns assigned to his ward. Although training begins with the fundamentals of the western model, it tries to apply itself to the problems of the tropics and emerging nations.

Some of these problems represent the western medical world turned upside down.

Coronary-heart disease and many types of cancer are virtually absent. Whether factors such as diet, stress and inheritance play a protective role is under investigation.

The first human cancer (Burkitt's lymphoma) that seems related to a virus infection was described at Makerere. As a result, the National Health Institute of Bethesda, Md., built a small research branch of the National Cancer Institute there.

Lung and bowel cancers, common in America, are virtually unknown in Uganda. Dr. Burkitt, who first de-

(Concluded on Page 7)

MGH News

Vol. 30 No. 5 MASSACHUSETTS GENERAL HOSPITAL, BOSTON, MASSACHUSETTS May, 1971

A Dramatic New Approach to a Deadly Old Ill

Solutions are beginning to appear for cardiogenic shock, the most deadly complication of a heart attack.

Three of nine patients treated at the MGH in a dramatic new way have defied the essentially 100-percent fatal condition. They represent the first three such cases documented in world medical literature.

The first, a 50-year-old Massachusetts lawyer who has returned to full-time practice, has now survived for 10½ months. The second has lived six months, and the third, three.

Should early good results continue, an estimated five percent of the patients admitted to the MGH with heart attacks may eventually be candidates for the procedure which combines use of an artificial heart-assist device and the surgical bypassing of one or more blocked major heart arteries. For these patients many believe the combined procedure holds more promise than heart transplants.

The operation on the lawyer was first reported last December in the *New England Journal of Medicine*. At the time the MGH team which treated him was pleased but emphasized that this was only one case.

While still cautious, the team is very encouraged by the two subsequent successful cases.

"Three of nine is a highly gratifying percentage for patients who almost certainly would have died without this new combination of procedures," said Dr. W. Gerald Austen, Chief of Surgery.

Four other persons who fit in the same category were considered candidates for the operation. One of those

(Continued on Page 4)

Health Institutions in the Changing Society

EDITOR'S NOTE: *With America's health-care system under fire, MGH's General Director, in his 1970 annual report, evaluates medicine's role in society. Dr. John H. Knowles' report is previewed here.*

I believe that during this decade all Americans and their institutions will take new directions and attempt to answer the question of how best to provide basic human rights to all Americans . . .

Should we have more federal legislation or less? How can we avoid the hazards of the welfare state while assuring all Americans of certain of its real benefits?

How do we maintain individualism and the force of the "silent hand" of self-interest while providing for the collective good?

How do we rationally reorder our national priorities? How much should we allocate for services as contrasted with research and technological development? How much to infants and youth versus the elderly? How much to renal transplants and intensive care units versus nursing homes, chronic hospitals, drug and alcoholism programs? How much to health education, rehabilitation services and preventive medicine as contrasted with nutritional programs, jobs, transportation, education, housing, pollution and population control?

De facto we have made and are making these decisions. Are they rational for the last third of the 20th century? If not, how can we politically and economically provide for viable change – evolution and productive, peaceful revolution?

. . . I believe we are approaching the end of a cycle of massive industrial development. We are now passing into a "postindustrial," "technetronic" society which will be oriented increasingly to the rational development of human services – all aimed at improving the *quality* of life.

Bertrand Russell has said: "One of the troubles of our age is the habits of thought cannot change as quickly as

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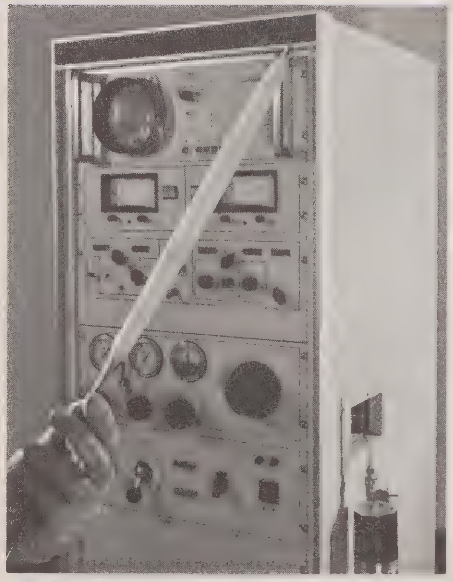

Balloon pump used to keep patient alive until dramatic operation. In background are circulatory assist and control console which powers the pump and keeps it synchronized with the heart.

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EDITORIAL:

Putting Two Procedures Together

A combination of circumstances resulted in the MGH putting together the two procedures which have opened a new avenue of treatment for patients developing deadly shock after heart attacks. Decades ago Dr. Robert R. Linton of the MGH helped pioneer blood-vessel surgery. He continues to teach these techniques to new generations of surgeons. About three years ago surgeons developed a method of using vein grafts taken from the patient's own leg to bypass blocked areas in arteries leading to the heart. The MGH with its tradition of vascular surgery was one of the early hospitals to use this technique.

Under a multi-million-dollar contract from the National Heart and Lung Institute, this hospital developed one of the original five Myocardial Infarction Research Units set up in the country to study heart attacks. One of the developments of this unit in cooperation with Avco-Everett Research Laboratory has been a balloon-pump heart-assist device for use in cardiogenic shock. The hospital's Catheterization Laboratory team learned to perform crucial X-ray studies while patients in cardiogenic shock were being assisted by the balloon pump.

Very cautious and conservative in its use of the balloon pump, the hospital has confined it to very sick cardiogenic-shock victims who were dying despite conventional drug treatment. The balloon by itself may prove quite helpful for less severely ill patients. In the meantime, it has proved its value in keeping the condition of patients in cardiogenic shock from deteriorating for several days. Its proved safety and its short-term therapeutic success made possible the first dramatic new step in 30 years for treatment of cardiogenic shock complicating a heart attack: emergency surgery to bypass blocked areas in the diseased arteries causing the heart attack.

That the new combination of balloon pump and diseased-artery replacement can work is becoming increasingly evident with each new attempt. The long-range outlook, however, remains a question for time to answer. Right now the MGH is one of only a few hospitals in the world with the necessary expertise and equipment to combine the procedures. How many hospitals will adopt the combined procedure will probably depend in part on the balance of the number of people saved versus its cost. Like all open-heart surgery this one is expensive because of the large number of highly skilled persons who must take part. At this early stage, however, many believe that for patients in acute cardiogenic shock, the new MGH tool shows more promise than heart transplantation.

BOOKS:

Pioneer in Modern Medicine: David Linn Edsall of Harvard

By Joseph C. Aub and
Ruth K. Hapgood
(Boston; Harvard Medical Alumni
Association, 1970)

Review by Alexander Leaf, M.D.
Chief of Medicine, MGH

"Writing the life of David Edsall has also meant writing the medical history of an era." With this statement, Joseph Aub, Honorary Physician at the Massachusetts General Hospital and Emeritus Professor of Medicine, Harvard Medical School, and Ruth K. Hapgood introduce their fascinating story of an epoch in medicine.

The first quarter of the present century is the time, and the action takes place in all the major university medical centers in this country; the actors include most of the eminent personalities in American medicine of that period. Much of the narrative is embellished by glimpses into the personal life of Edsall which Aub provides with obvious affection and esteem for his teacher.

The book provides a very readable balance between entertaining anecdotes involving the lives of personages whose views and actions molded medicine as we know it today, and the serious concerns and thoughts about medical education, the training of a faculty and the role of science in the practice of medicine.

Edsall's great contribution to medicine was to bring quantitative science into what was then a descriptive art. His own work was not distinguished by any major scientific breakthrough, but he had trained himself in chemistry and its clinical application well beyond what was fashionable in the education of a physician in those days.

His ability to bring the new clinical chemistry and physiology to the bedside and to imbue his students with the need to analyze their patients' problems in terms of disturbances of function rather than diagnostic empiricism was his contribution. He brought the same rational approach to therapy – correcting disordered function rather than treating symptoms.

His impact on his students and upon the philosophy of education at Harvard was great, but his main legacy was the

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Health Institutions in the Changing Society

(Continued from Page 1)

techniques, with the result that as skill increases, wisdom fades."

Perhaps this is true, but I prefer Jerome Bruner's analysis: "With technological advance, more things are possible, but social and technical organization is increasingly necessary to bring them off. In effect then, the sense of potency – the idea of the possible – increases in scope, but the artificer of the possible is now society rather than the individual."

The "social and technical organization" is the organization and administration of the hospital and of the outside forces. . . . "Society" – the people of the community or country – (as the "artificer of the possible") is in essence represented by all these institutions and organizations.

Their interaction and the decisions and directions that result define the movement of a given field – in this case, medicine and health services. The institutions are those of health (for example, hospitals and nursing homes), education, welfare, medical and other professional and technical societies, government, financing (like Blue Cross and private insurance companies), licensure, law, private or civic groups, and unions.

When one thinks of institutions and their administration, one thinks of bureaucracy, that social invention conceptualized by the sociologist Max Weber, which says that men can and will manage an institution or a business according to rule and reason.

Recognizing that organization and administration are means and not ends, the bureaucratic method has become anachronistic for four reasons:

(1) The steady increase in knowledge and technology cannot be handled efficiently by a rigid pyramidal structure – individuals may become intellectually obsolete too rapidly and may be overwhelmed with decision-making;

(2) The increasing quantity and quality of transaction with outside institutions, whether they be schools, hospitals, civic groups, industrial or professional organizations, government and so on, lead to instability – and with increasing interdependence, the managers of institutions become progressively less effective and more governed by outside forces;

(3) Competition diminishes as institutions become more interdependent and have to plan together – resources are finite, and priorities have to be established;

(4) The newfound power of collectivism, whether it be old unions, new students, professors or technicians, which is challenging bureaucratic bosses and asking for key roles in the decision-making process, has European countries and the United States in a turmoil of ineffectual response.

We have passed from the age of individualism to that of the power of collectivism. Methods of administration and organizational structures must change with changing social conditions, changing intellectual activities, and changing technological capacities.

The ability of the bureaucratic system to adapt rapidly to these changes in knowledge and technology, to the forces outside the institution, to the decrease in competition and the increase in large-scale planning, and to the power of collective action and demand-ability has been and will be increasingly taxed.

I believe 50 percent of the bureaucratic method should be retained, i.e., that portion which simplifies and speeds communication and provides for implementation of change. Policy and change will be determined not by rigid requirements of defined roles in the pyramid but by *ad hoc* and constantly changing groups in and out of the institution who will provide the expertise and the intellect to solve shared problems rapidly, point the way for change and make final decisions.

The administrative head (and it is a sociological fact that any social group has a head!) becomes the coordinator – asking the right questions and knowing whom to assemble to provide the best answers – using both the formal and informal power structure to communicate and implement change.

The present environment changes rapidly. We are all interdependent; turbulence not stability is the order of the day; collectivism can effectively challenge existing order; institutions are growing; people are more mobile and more educated which leads increasingly to desires for freedom and autonomy; the mass media makes the whole world a "sage" and more and more experts occupy the center stage. . . .

The administrator lives in an era which recognizes that people will be differentiated not according to rank but according to skill and professional training. . . . Democracy is upon us; free communication is a necessity and cements complex institutions, and influence will be exerted on the basis of knowledge and skill and not the prerogatives of bureaucratic power.

The pyramid should be inverted with the administration at the bottom, the patient and the student at the top (i.e., the base), with multiple freewheeling excrescent experts popping in and out of the administrative structure. . . .

The nation is poised to take new directions in the resolution of massive domestic problems – and so is the MGH. We are a part of the main.

"How much to infants and youth versus the elderly?"

A Dramatic New Approach to a Deadly Old Ill

(Continued from Page 1)

four refused surgery, and tests revealed an operation could not help another. Both died. The remaining two died before surgery was attempted. Of the two survivors, in addition to the lawyer, the ages range from 37 to 57.

The danger common to all these cases is cardiogenic shock complicating a heart attack. Heart attacks occur when part of the heart muscle is deprived of blood normally flowing in from the coronary arteries. Formation of a clot of blood trapped in one of these is the most frequent cause. Since the blood flowing to the heart contains fresh oxygen needed to sustain life, the deprived portion of the heart eventually dies.

Although the heart is referred to as a pump, only the lower two of its four chambers do the actual pumping: The right ventricle pumps blood to the lungs where it picks up oxygen. The left ventricle pumps the newly oxygenated blood from the heart to the body via the main artery, the aorta.

This latter pumping action requires a great deal of power. The thrust given by the left ventricle must push the blood into the aorta with enough force to carry it on its nourishing mission throughout the rest of the body.

When the force is powerful enough, the pressure of blood surging through the arteries peaks with each beat. Loss of power by the left ventricle results in blood pressure that is too low.

A severe heart attack temporarily cuts off the supply of blood nourishing large segments of the left ventricle. If as much as four-tenths of that ventricle temporarily loses its blood supply, a correspondingly large part of the ventricle will begin to die.

The muscle then weakens so much it usually loses its efficiency as a pump. Doctors call this "pump failure" or "power failure." Blood pressure then drops drastically until shock results. In such cases the shock is "cardiogenic," or heart produced.

In an effort to regain power, nature makes the left ventricle larger and larger. In such severe cases nature fighting alone almost always fails, and the patient dies.

Physicians try to assist nature with drugs. Medication temporarily supports sagging circulation. Sometimes temporary support gives the left ventricle time for a sufficient amount of its muscle to recover. Too often – four out of five times – the patient dies despite medication. And if drugs fail, the likelihood of death soars to essentially 100 percent.

While physicians have made progress against other complications from heart attack (November, 1970, *MGH News*), cardiogenic shock has continued to plague the experts.

"Up to now, we've made almost no progress in treating it in 30 years," said Dr. Roman W. DeSanctis, Director of the MGH Coronary Care Unit.

Five years ago, the MGH and Avco-Everett Research Laboratory began to develop a balloon pump designed to assist the left ventricle in power failure (story on page 6).

Looking down on scene during first historic operation.

Dr. Mortimer J. Buckley, Jr., and Dr. Austen of the MGH and Arthur Kantrowitz, Ph.D., Director of Avco-Everett, were the prime movers.

After years of experimentation with animals, the MGH cautiously began usage in humans. The physicians carefully chose only the sickest of patients dying of cardiogenic shock.

The balloon has helped at least five patients to recover. It has proved safe and shows promise for less severely ill patients.

"It has become quite clear from our experience with severely ill patients," said Dr. Eldred D. Mundth, an MGH heart surgeon, "that the balloon's maximum effect in helping the left ventricle to pump blood is reached within 48 to 72 hours after insertion." At that point the condition of the heart may begin to deteriorate despite the balloon.

An MGH pathologist, Dr. James B. Caulfield, studied the hearts of patients who died despite balloon-pump heart assist. He found that the amount of damage to their left ventricle before balloon assist had already been massive.

Clearly some additional technique was in order. A surgical procedure developed about three years ago for non-emergency conditions was a possibility. The MGH, a Harvard Medical School teaching hospital, has performed the operation more than 200 times with good success.

There were no documented cases, however, of a patient surviving the procedure when already in cardiogenic shock complicating a heart attack.

On May 22, the Massachusetts lawyer suffered a heart attack and was admitted by Dr. William F. McNeely to the Coronary Care Unit.

Twenty-four hours after admission, his chest pain became more severe, his blood pressure dropped, and he went into cardiogenic shock.

His response to drugs was poor, and with it his chance for survival dropped from 20 percent to virtually 0 percent. Dr. Peter Yurchak, consulting cardiologist in the case, agreed that the balloon pump was the only hope.

The 10-inch-long balloon was inserted through a small incision in the patient's upper thigh into the femoral (thigh) artery. Threaded into the aorta, the balloon lessened the left ventricle's work by taking over some of its pumping, and lowering the arterial resistance against which the heart must pump blood.

Within two hours of balloon pumping, the patient's condition improved. Over the next few days, he was well enough so that the balloon was removed on May 27 – five days after his admission.

A week later, chest pains and increasing heart failure developed. On June 16 another major heart attack struck. The course was a familiar one: fresh damage to the heart plus cardiogenic shock. Once more his condition continued to worsen despite drugs.

Doctors again inserted the balloon pump. Some improvement occurred with this circulatory assistance.

"Even with circulatory assistance," Dr. Mundth said, "we all felt that with this new injury to his heart his chance for survival was poor."

From experience with other patients, the physicians knew that the damage was too severe for the balloon pump alone to bring about recovery. For a two- or three-day period the balloon could reduce the heart muscle's demand for blood-borne oxygen. The patient's left ventricle, however, would need much more time for nature to develop alternate blood routes to replace the blocked arteries leading to the heart.

Dr. Yurchak chanced to be out of town during the hours when the crisis suddenly arose. Dr. DeSanctis consulted with members of the MGH team. All agreed to proceed with surgery.

To be given a reasonable chance for success, the operation requires that the surgeon know certain facts before he begins.

These facts come from an angiogram, an X-ray study of the arteries carrying blood to the heart. Such X rays provide a type of road map telling the surgeon where and how badly the three arteries are damaged.

To perform the study requires injection of a dye which momentarily depresses the heart. Dr. Charles A. Sanders, Director of the Myocardial Infarction Research Unit at the MGH, observed:

"The contrast medium employed is no problem for the usual heart patient. We're all convinced, however, that in patients in severe cardiogenic shock, even the momentary depression could prove fatal."

The MGH group had previously worked out a procedure in which the examination is conducted while the balloon heart-assist device continues to aid circulation and lessen the heart load.

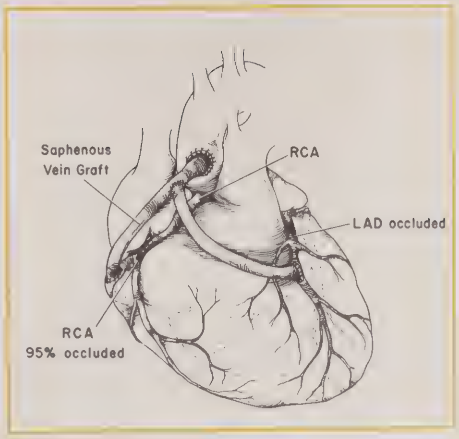


Diagram shows areas where two major heart arteries (RCA and LAD) were blocked or nearly blocked (occluded) in first patient. Saphenous vein graft taken from patient's own leg was used to bypass obstructed areas, thus providing oxygen-rich blood for heart muscle.

The study on the lawyer, done by Dr. J. Warren Harthorne, showed extensive but correctable coronary (heart) artery disease. Two of the three major coronary arteries were blocked – one completely and the other 95 percent.

Far too little blood was reaching the heart. In addition the study showed that the left ventricle was contracting very poorly.

"We decided," Dr. Austen said, "that his only chance for survival was to take him to the operating room to do an emergency coronary revascularization procedure."

Late on the night of June 17, the historic surgery began. Dr. Phillips Hallowell directed the critical task of managing the patient's anesthesia.

Balloon-pump circulatory assistance continued until anesthesia began flowing. Then the heart-lung machine, which takes over the duties of the heart and lung, was turned on at the same time the balloon pump was turned off.

A large portion of the heart was seen to have been damaged by the more recent heart attack. During the 90 minutes the heart was stopped, the surgeons bathed it in a very cold salt-water solution to protect it.

Dr. Mundth and his surgical team removed a 1½-inch plug of material blocking a portion of one major coronary artery. Large veins (saphenous) removed from the patient's own leg were connected between the aorta and the two blocked arteries, bypassing the obstructed portions.

Blood flow from the aorta to the major arteries supplying the heart was very much improved.

The balloon pump was kept in readiness in case it was needed to assist the heart after surgery. It never was.

"His heart," Dr. Mundth said, "now was able to work quite efficiently in maintaining his circulation whereas, before the surgery, it couldn't possibly do it without balloon-pump assistance."

The patient's condition improved after the operation. He required less and less drugs (inotropic) to enhance the heart's pumping action, and on the fourth day after the operation, he no longer required medication. During the postoperative period nurses in the Cardiac Care and Surgical Intensive Care Units helped greatly.

One week postsurgery, he was allowed to get out of bed, and 23 days following surgery he was discharged. Even after resuming his law practice, he has remained free of the chest pain which had plagued him in recent years.

More to Offer Than Heart Transplantation?

Use of emergency surgery in cardiogenic shock complicating a heart attack (page 1 story) remains in the developmental stage.

Since the first case, however, the balloon pump, developed by the MGH and Avco-Everett Research Laboratory, has gained increasing importance. It now continues pumping during the surgery itself.

"The sort of intermittent pulsation provided by the balloon pump," Dr. Roman W. DeSanctis, Director of the Coronary Care Unit, said, "seems better for the various organ systems such as the kidneys and liver. Now most of the patients are supported by the balloon during surgery and postoperatively as well."

The precise effect of the balloon during surgery is still under study. Under intense investigation are the criteria to determine which patients should undergo the emergency surgery.

"We're still learning," said Dr. Charles A. Sanders, Director of the Myocardial Infarction Research Unit. "We are trying to separate the type of patient who can be benefited by this surgery from the patient with no chance of survival short of transplantation."

(Continued on Page 6)

(Continued from Page 5)

Two factors seem to be emerging thus far. The persons with the best chance seem to be those whose left ventricles remain relatively normal in size and retain some of their ability to contract. The comparatively small size of their hearts indicates that the cardiogenic shock has been of fairly short duration.

A huge ventricle which has lost its ability to contract may have gone beyond the point of no return. Not even a normal blood supply made possible by surgery is likely to restore such heart cells.

"We have to be concerned as well about the quality of life that is preserved," Dr. DeSanctis said. "A very elderly patient with other infirmities would not be an ideal candidate."

Another question that has to be resolved is one of timing.

"At what point," Dr. Eldred D. Mundth, heart surgeon, asked, "can we say that a patient needs the balloon and studies and surgery?"

Dr. Sanders' group is gathering evidence that indicates earlier intervention – within the first few hours – may prove beneficial.

"Patients with whom we cautiously waited for five or six days," Dr. Mundth said, "fell in the group who did not survive.

"I think that we will see a great increase in the number of patients who are operated on, and hopefully we will see an increase in the survivals."

The pattern of timing that has developed so far remains fairly clear:

Drugs for patients who go into cardiogenic shock: if drugs fail, then the balloon pump; if the patient needs prolonged balloon assistance, then surgery.

Surgery for some patients means removal of part of the heart muscle deadened by the heart attack. For others, it means the type of bypass procedure described in the page 1 story. For still others, it means a combination of the two procedures.

Dr. Mortimer J. Buckley, Jr., the surgeon who directed balloon development at the MGH, considers that the procedure has progressed beyond the trial phase:

"We are trying to save lives where nothing else has succeeded, and by using well established means to do it, but in different combinations."

Dr. DeSanctis reserved judgment about how widespread the use of the new procedure will become across the nation as a whole:

"I think it is quite obvious that this isn't something that every institution is going to do. The question must be asked and ultimately answered as to whether the total amount of investment in time, money and effort will be worthwhile in relation to the total number of lives saved. Frankly I am optimistic that it will.

" . . . At the present time, however, I think that in the sort of situation with which we have been dealing this acute procedure has more to offer than heart transplantation."

Lightening the Task Of the Sick Heart

In 1966 the MGH and Avco-Everett Research Laboratory joined forces to develop a balloon pump for treatment of cardiogenic shock resulting from a heart attack.

Dr. W. Gerald Austen, Chief of Surgery at the MGH, and Dr. Mortimer J. Buckley, Jr., a heart surgeon, performed the MGH portion of the studies. At Avco-Everett, Arthur Kantrowitz, Ph.D., Director, headed the team of cooperating engineers.

The balloon is designed to fit into the aorta, the main artery leading from the heart. Early animal trials presented a problem.

The conventional-shaped balloon first used tended to inflate at the ends before the center. As a result the narrow center trapped the blood and caused the surrounding section of the aorta to expand. The amount of blood flowing through the aorta thus decreased, and the expanded area of the aorta suffered increased stress.

To prevent these problems, a three-segment balloon with separate gas holes was developed. The center segment inflates first to avoid the original problems.

Extensive animal experimentation showed that the balloon worked. In 1969, it was ready for trial in patients dying of severe cardiogenic shock which failed to respond to any other treatment.

Under local anesthesia the 10-inch balloon is inserted into the aorta.

An electrocardiogram (EKG), which receives electric impulses from the patient's heart, signals an electronic computer circuit in the balloon pump's external control console.

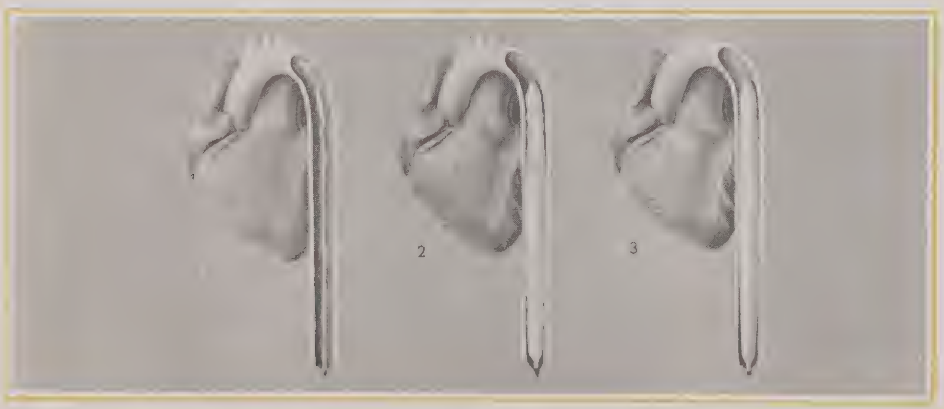
The patient's own heart rhythm thus determines when the console sends gas into and out of the balloon. While the heart rests, helium gas inflates the balloon. The expanding balloon squeezes blood down the aorta and through the body.

Back pressure from the balloon forces blood, carrying oxygen, into the coronary arteries to feed the heart muscle. As the heart signals it is about to contract, the balloon rapidly deflates. The resulting low pressure in the aorta lets the weak heart pump easily.

Thus the heart's task of pumping is lightened, and when the heart rests between beats, the balloon itself takes over the role of pumping. This principle is called counterpulsation.

The console itself has a number of fail-safe devices which protect against balloon leakage and other possibilities.

Several other hospitals are now employing the balloon pump. Used with more than fifty patients in all, the balloon has proved safe.



The balloon in operation: 1. The heart contracts, pumping blood into the aorta. The balloon is deflating. 2. The heart begins to relax; the aortic valve is closed. The balloon is expanding, forcing blood into both the upper and lower body. 3. The heart is fully relaxed, the balloon fully inflated. As the heart begins its next cycle, the balloon deflates, leaving a low-pressure area in which the heart easily pumps.

Research in Genetics: For Good or Evil?

"Though the dangers from genetic research seem to me very small compared with the benefits, they do exist: its application could conceivably be used unwisely and even malevolently. But such potential abuses cannot be prevented by curtailing genetic research."

This is the opinion of Dr. Bernard D. Davis, Adele Lehman Professor of Bacteriology and Immunology at Harvard Medical School. He told an MGH Research Colloquium:

"The sacrifice would be even greater in the field of cancer, for we are on the threshold of a revolutionary improvement in the control of these malignant hereditary changes in somatic cells [cells of the body], and this achievement will depend on the same fundamental research that also contributes toward the possibility of gene transfer in man."

This point was proved meaningful by two lecturers who spoke in conjunction with the colloquium. These two noted young scientists delivered the prestigious Warren Triennial Prize lectures at the hospital.

Dr. Howard M. Temin, Professor of Oncology (study of cancer) at the University of Wisconsin, and Dr. David Baltimore, Associate Professor of Microbiology at Massachusetts Institute of Technology, were co-winners of the international award and lectureship.

They have independently shown that the transmittal of genetic information in the cell can in effect be reversed by some cancer viruses. Their research is an important finding for scientists trying to prove that viruses are present in human cancer but also has wider implications in genetic research.

Their investigation centers on previously undetected means of influencing the metabolism of DNA (deoxyribonucleic acid). DNA is the substance of genetic units called genes, the structure of which was described by Drs. Francis H. Crick and James D. Watson, Warren lecturers in 1959, who later won a Nobel Prize for their work. The 1956 lecturers, Drs. Arthur Kornberg and Severo Ochoa, also later became Nobel laureates.

Specifically, Dr. Temin and Dr. Baltimore have been working on RNA viruses and how information can be transmitted from virus to virus. RNA is another form of the complex acid which like DNA is vital to the function of cells.

The two scientists have shown that genetic coding present in the RNA can be transferred to the DNA of the host cell – a reversal of the usual process whereby the information is transmitted and stored in DNA and transferred to the RNA.

Their proof of this backward coding is causing scientists to wonder whether conventional coding is an evolutionary newcomer.

At the research colloquium, Dr. Davis pointed out other benefits of genetic research after clarifying some misconceptions and evaluating the dangerous applications of such study.

He explained that the study of genes that "exert an all-or-none control over a corresponding monogenic trait [a trait caused by one gene] has continued to dominate the field of genetics." Monogenic traits include, for example, flower color, eye color, and hereditary disease such as hemophilia.

However, he said that such traits constitute a small special class. "Most traits are polygenic: that is, they depend on multiple genes, and so they vary continuously rather than in an all-or-none manner." The human traits of intelligence, temperament, and physical structure are highly polygenic. The study of such inheritance is still in a primitive state, Dr. Davis said.

Complications of this study include the fact that "even a full set of relevant genes does not fixedly determine the corresponding trait. Rather, most genes contribute to determining a range of potential for a given trait, while past and present environment determine an individual's actual state."

He outlined the possibilities of genetic manipulation. He believes that even when man is able to isolate a human gene, manufacture and modify it in a test tube, there are many obstacles to incorporating it intact into a body cell. Even if this were possible, it may be very difficult to introduce the gene into every cell that would benefit.

Another possibility is directed mutagenesis, "the use of agents that would bring about a specific desired alteration in DNA." Such a desired change would be the reversal of a mutation that made a gene defective. If this were possible, it would be very beneficial, because it could exempt the children of a person with a defective gene from inheriting the disease caused by one faulty gene.

Flower color is a monogenic trait, a characteristic controlled by a single gene.

However, the search for ways to direct and control the desired changes has not yet proved successful. Dr. Davis said that all known agents which bring about mutations cause virtually random ones, of which the vast majority are harmful rather than helpful.

Changing behavior through genetics, Dr. Davis believes, is not very realistic. Improvement of behavior traits that are caused by many genes would almost certainly require replacement in germ cells (egg or sperm) of a large but specific amount of DNA. He does not believe such controlled replacement is very likely. It would be easier to impair cerebral functioning by gene transfer, since this can be caused by monogenic diseases.

One type of asexual reproduction (without sexual union) called cloning may some day be possible. Each cell of the body of an individual (those from muscle, skin, etc.) contains in its nucleus the same complete set of genes. Therefore, each somatic (body) cell contains all the genetic information required for copying the whole organism.

Differentiation into muscle, skin, etc., is the result of a mechanism that makes some of the genes active at one time, and some at another, with the resultant determination of whether the cell is muscle, skin, etc. Any nucleus of any cell could be used to start an embryo which would be an exact genetic copy of a single parent.

Another type of cloning is already

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Research in Genetics: For Good or Evil?

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possible in mammals. "When relatively undifferentiated cells of an early mouse embyro are gently separated, each can be used to start a new embyro. However, these identical twins would be of an undetermined genetic structure rather than of an already known adult." Dr. Davis doubts that this type of reproduction is tempting for use in man, unless producing identical twins gains special social value.

Dr. Davis pointed out that any society wanting to control the evolution of its gene pool has long had a method of doing this – selective breeding. A moratorium on genetic research would in no way prevent future manipulation of gene pools in this manner.

Evaluating the dangers of genetic manipulation, Dr. Davis repeated that although man may eventually develop ability to incorporate genes into human germ cells and thus repair monogenic defects, he would still be far from altering highly polygenic behavior traits.

The use of cloning (asexual reproduction) in man may be tempting, Dr. Davis said, especially in fields where major achievements are restricted to a few gifted people.

He pointed out, "A succession of identical geniuses might exert an excessively conservative influence, depriving society of the richness that comes from our inexhaustible supply of new combinations of genes."

Also, because cultural climate plays such a large role in the development of genius – especially in literary, social and political fields – even an exact copy of a previous genius would very possibly fail to develop into another.

A greater threat, Dr. Davis believes, would be the use of cloning for the large-scale reproduction of a few selected individuals. If cloning were extended in this way to homogenize the population to a great extent, it would create an evolutionary danger. The success of a species depends in part on a sufficient genetic variety to include some individuals who could survive in any future environment.

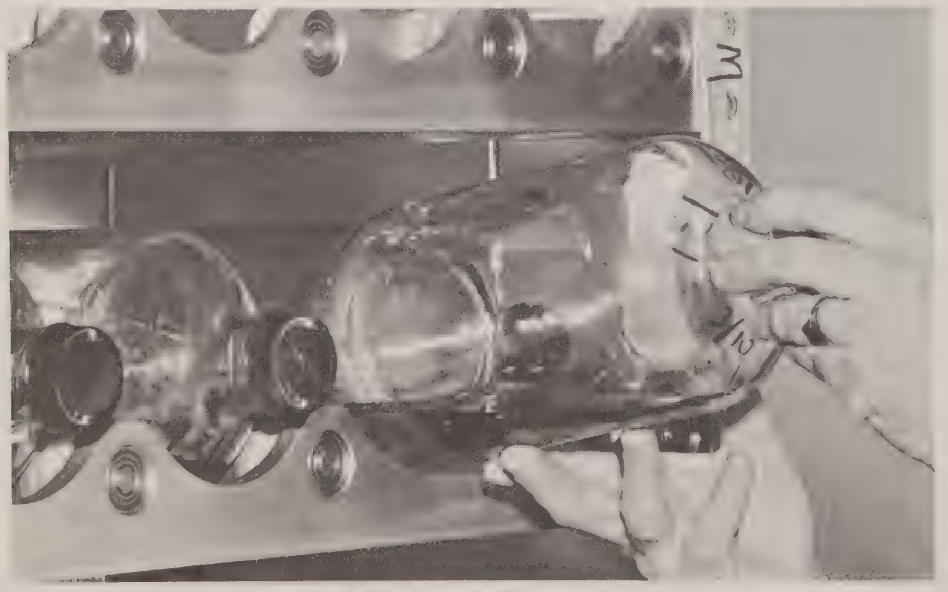
He points out that we have long lived with a similar threat. "Any male can provide a virtually limitless supply of germ cells, which can be used in artificial insemination, yet genetic homogenization by this means has not become the slightest threat."

The benefits of genetic research greatly outweigh the danger, Dr. Davis believes.

"For one thing, we already have on hand a powerful tool (selective breeding) that could be used to influence the human gene pool, and this technique could be used as wisely or unwisely as any future additional techniques.

"Moreover, since the greatest fear is that some tyrant might use genetic tools to regulate behavior, and especially to depress human potential, it is important to note that we already have on hand pharmacological, surgical, nutritional, and psychological methods that could generate parallel problems much sooner.

"Clearly, we shall have to struggle in a crowded and unsettled world to prevent such a horrifying misuse of science and to preserve and promote the ideal of universal human dignity. If we succeed in developing suitable controls we can expect to apply them to any later developments in genetics. If we fail – as we may – limitations on the progress of genetics will not help."



Culturing human cells for genetic research.

(Continued from Page 2)

generation of outstanding physician-teachers whom he stimulated to pursue careers which exemplified his faith in the importance of science in medicine – Aub, Means, P. D. White, Cecil Drinker, Minot, Rackemann, Gamble, W. W. Palmer, Carl Binger, Stanley Cobb are among those whose names will be longest remembered at the MGH.

MGH News

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Telemedicine Enters the Era of the Troubled Youth

Telemedicine – the practice of medicine over television – has embarked on a new adventure. Psychiatrists are counseling schoolchildren of several communities on problems such as drugs. In another television project psychiatrists are giving advice to officials of two district courts.

Called telecounsel, the two experimental MGH undertakings have gone on without publicity for several months.

In the case of the district courts in East Boston and Chelsea, MGH psychiatrists have been acting as consultants to court officials striving to evaluate youths in trouble. In the school programs the physicians have been counseling troubled youths.

Dr. Kenneth T. Bird, Director of Telemedicine at MGH, explained the purpose of telecounseling:

"There is going to be an increasing need for counselors of all sorts in view of the devastating times in which we live. And it may be that bringing counselors to communities through two-way television may reach youngsters before patterns of drug addiction, rebellion and disenchantment are fully established. It may also be that if we can offer them the appropriate counseling, we will have less of the crisis that youth seem to face today."

One of the pilot programs has just concluded at Nahant Junior High School. Group interviews over the MGH telemedicine system delved into whatever concerned the youngsters. Topics introduced by the teen-agers ranged from parents to drugs and sex.

Dr. Thomas F. Dwyer, MGH psy-

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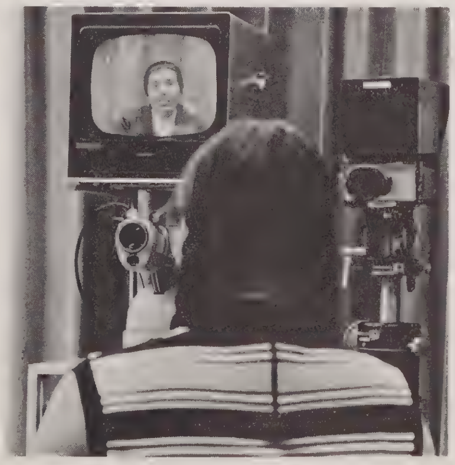

A new adventure for telemedicine.

Radiology – Considerably More Than X Rays

Those who think radiology begins and ends with X rays of the human interior have not listened to Juan M. Taveras.

The new Chief of Radiology at the MGH exudes excitement as he describes the frontiers of his field. When he assumes his MGH post in August, he will bring with him the broad knowledge that he applied as director of one of the outstanding units in the country: the Mallinckrodt Institute of Radiology at the Washington University School of Medicine in St. Louis.

Dr. Taveras envisions modern radiology as partly dependent on physics, engineering and chemistry.

"Physics and engineering," he said, "are connected closely with the possibility of developing new radioactive isotopes as tools for patient care and research. Radiation chemists synthesize the substances that we use with the goal of improving patient care.

"So it is my hope to create here within the Department of Radiology a division of radiological sciences and technology which will bring these scientists together."

Besides his broad interest in the general field of radiology, Dr. Taveras is considered one of the world's foremost experts in neuroradiology, the branch that deals with the brain and central nervous system. It was he who established the use of the X-ray study of the brain's blood vessels to diagnose brain lesions in infants and children.

With Dr. Ernest Wood, formerly of Columbia-Presbyterian Medical Center, he authored a textbook on diagnostic neuroradiology that has become a standard reference work in this field.

Physicians recognize an increasing number of disorders of the brain and central nervous system.

"In the past," Dr. Taveras said, "the idea was that there was nothing that specialists – neurologists and neurosurgeons – could do for these large numbers of patients. Well, one very important factor in improving the care of neurological patients has been the development of better radiological procedures for diagnosis and localization of disease. It is surprising how accurate this can be when we use all the available methods.

"Radiology remains largely a diagnostic field. But even outside of cancer therapy it has become a tool with which to treat as well as to diagnose."

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EDITORIAL:

An Aura of Artificiality

Telecounsel, announced in this issue of the *MGH News,* is operating under artificial conditions. Individuals come from places like Nahant or Juvenile Court in East Boston to the telemedicine room at the MGH's Logan Airport Medical Station.

This could change. In the courts, for example, judges daily jail youngsters, even though they lack an adequate psychiatric examination. Under a recent law a drug-dependent defendant may request a psychiatric evaluation. An acute shortage of psychiatrists, however, makes it unlikely that a psychiatrist will regularly spend 90 minutes or so to fight traffic to and from a court and to park. Court dockets are already inordinately long. Delays in psychiatric examinations and the resulting report obviously impede progress. A telecounsel camera leading from a teaching hospital to a courthouse could produce a psychiatrist with the speed of a television beam.

As Dr. John H. Knowles, MGH General Director, has predicted, telemedicine will revolutionize the practice of medicine. Dr. Leon Eisenberg, MGH Chief of Psychiatry, envisions a trained nonphysician delivering first-line care to patients in a rural community. Backing up that allied medical practitioner would be a telemedical system with a physician responsible for care in an area with several such communities. Dr. Kenneth T. Bird, founder of telemedicine, would carry that concept a step further to include consultations between a number of these first-line physicians and a teaching hospital. The allied medical practitioner would handle the routine problems, consulting the physician over television when he needs help. In turn, if some specialized problem arose, the physician would present the patient over television to the teaching hospital.

The three MGH experimental programs – telediagnosis, telepsychiatry, and now telecounsel – have proved the feasibility of these approaches. Telemedical education, which started as a spin-off of telediagnosis, has burgeoned as an important development itself. Advancing technology will enhance all these aspects of telemedicine and reduce its cost.

Indeed the cost of developing and continuing telemedical networks has slowed their expansion. Once funding agencies fully realize the potential, such networks will begin to link the nation. Telemedicine is not a panacea. But it can go far toward curing the national ill resulting from clusters of physicians treating patients in wealthy suburbs while ghettos and rural areas cry out for doctors. Telemedicine will make it possible for the doctor to enjoy life in the suburbs while practicing medicine in the country. Redistribution through television will one day help spread both quality and quantity of care throughout the land.

Telemedicine in Era Of Troubled Youth

(Continued from Page 1)

chiatrist who is Project Coordinator for Telepsychiatry, continues to be amazed at the openness of the teen-agers appearing over the system for the first time.

Dr. Raquel E. Cohen, Associate Director of the Harvard Medical School's Laboratory of Community Psychiatry, has a theory about this:

"This generation has been brought up since infancy with television. I think that it must be a very intimate sort of identification with television which allows them to react this way."

Dr. Cohen believes that in some ways the youngsters are more open in talking to a psychiatrist over television than in person:

"They seem to be a little more comfortable. Television gives them a little distance and a sense of control. I think there is a feeling when you're in the same room with a doctor – especially if you are young – that you are trapped.

"While on television you are much more in command of what is going on in the room. All you have to do is either walk away or turn off the dial."

Dr. John G. Clark, Jr., an MGH psychiatrist, set up the Nahant program with the cooperation of Principal Leonard Piazza and Miss Ann Grant, a guidance counselor at the junior high school.

Any of the 160-odd members of the student body seeking counseling over the system were offered the opportunity. About 40 percent accepted.

They formed clusters of five in the telemedicine room at MGH's Logan Airport medical station. At the MGH end a psychiatrist fielded their questions. Helping him was a member of Project Place, a South Boston organization which assists street people. Often the junior high school youngsters identified more easily with the young Project Place representative than with the psychiatrist. Social workers and other MGH health professionals also took part.

Dr. Dwyer has found many of the pupils more discriminating than some adults about subjects like drugs:

"Some grown-ups think everyone who takes drugs is deprived. The kids differentiate among those taking drugs to show off, to get back at their parents, to join the gang or to defy their parents' orders."

The psychiatrists and other counselors have tried to show the youngsters how they can communicate better with their parents.

Each cluster of teen-agers had three sessions of 45 minutes during school hours. When a youngster needed further help, he was referred to an appropriate source such as the MGH Child Psychiatry Clinic, or a local institution, or social service agency.

At first, some of the parents had expressed skepticism about the program. Now a number of the parents themselves have asked for their own telecounseling sessions.

Dr. Dwyer considers the opportunity for improving communication between adolescents and adults crucial:

"Some kids, I think, do take drugs or steal to get back at their parents. If you can remove the reason for getting back at them, you might prevent or remove these problems."

While the group approach has been tried with the Nahant youngsters, individuals see the MGH psychiatrist in another telecounsel pilot project. In a continuing program, East Boston schools refer children needing help to the system.

The youngsters go to the telemedicine room at the airport, also in East Boston. At the MGH end sits the psychiatrist.

Project Place itself refers some youngsters for evaluation or treatment. Nearby communities, such as Chelsea and Winthrop, also refer children.

One 11-year-old boy sent by Project Place had run away from a broken home where he was abused. He had spent months on the street, living by his wits.

His psychiatric referral came because he had stabbed someone in the leg. It turned out that he was quite normal for a child of the street. He had stabbed a six-footer who had molested him.

In many cases the parents of youngsters referred to the system are themselves seen over it.

The pilot project joined to Judge Guy J. Rizotto's East Boston District Court operates differently. Probation officers from the court "meet" an MGH psychiatrist at least once a week over the telemedicine system. The psychiatrist counsels the officers about the youngsters.

More than 50 juveniles on probation have been evaluated over the system by the psychiatrist.

"As you might imagine, these are extremely disturbed children and families," Dr. Dwyer said. "The most usual case is the child whose father has left home, whose mother is living with another man along with half brothers and sisters. The child typically gets into trouble by breaking and entering."

Telecounsel has now witnessed more than 250 individual sessions called transactions. Sixty percent have involved East Boston residents.

Including teleconsultation sessions between the Bedford Veterans Administration Hospital and the MGH, telemedicine has just completed its 2,000th transaction.

The dream of Dr. Bird, the system had been born in April of 1968 as telediagnosis. Its purpose was to use two-way television between Logan Airport and the MGH three miles away to determine whether disease could be diagnosed in that way (July-August, 1968, *MGH News*). Nurses regularly assigned to the airport represent an extension of the doctor's hands. But the physician at the hospital operates a remote-control camera at the airport.

Long before the system saw its 1,200th patient a few months ago, the idea had proved itself. A long list of specialized equipment makes this possible – like the electronic stethoscope enabling the doctor to listen to the heart of a patient three miles away. Closed-circuit controls protect the patient's privacy.

Out of telediagnosis evolved telepsychiatry.

"I had no idea," Dr. Bird recalls, "whether one could exchange confidences over television with a psychiatric patient the way one can examine a physical disease."

At first, most of the psychiatrists were skeptics. But with the cooperation of Dr. Leon Eisenberg, MGH Chief of Psychiatry, the experiment began in the spring of 1969.

One of the first patients at Logan startled Dr. Dwyer by threatening mass murder (September, 1969, *MGH News*). Over television Dr. Dwyer talked him out of his insane idea. In

(Concluded on Page 5)

Three Sources of Funding Have Supported Telecounsel

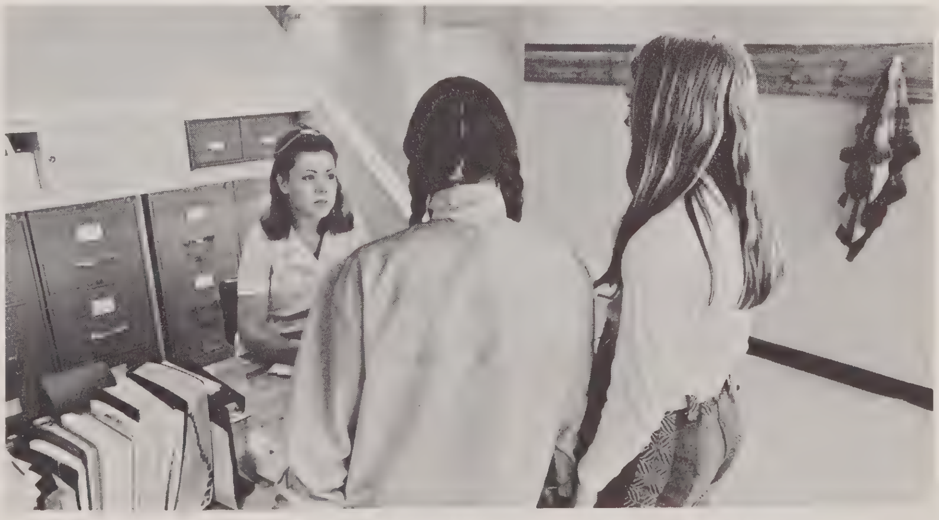
Three sources of funding have supported the telecounsel pilot projects.

The primary source has been the National Center for Health Services Research and Development of the U.S. Department of Health, Education and Welfare.

MGH General Director Dr. John H. Knowles' fund and a $75,000, two-year grant from the Massachusetts Port Authority are the other sources.

A grant from the Veterans Administration established the link between the MGH and the Bedford VA Hospital, a program which has helped lay the groundwork for telecounsel.

"We are looking hard and vigorously for additional funds," said Dr. Kenneth T. Bird, Director of Telemedicine. "We have high hopes that telemedicine will become one of the new ways to deliver effective, quality health care on a widespread basis at an economical cost. With the way that microwave transmitters are decreasing in cost, this becomes a reality."


Miss Geraldine J. Malone, secretary, registers Nahant Junior High School girls for telecounsel.

A Dramatic Vehicle For Applying Skills

On a television screen at the MGH a deranged man was gesticulating wildly.

The man was in the teleroom at the Bedford, Mass., Veterans Administration Hospital where he was an inpatient. Dr. Bernard Levy, an MGH psychiatrist, sat before the television screen, surrounded by eight of his third-year medical students. Under Dr. Levy's careful supervision one of the students was able to use some of the interviewing skills he had learned at Harvard Medical School. With appropriate permission, the event was recorded on video tape for later viewing by other medical students.

Dr. Kenneth T. Bird, Director of Telemedicine at MGH, said the incident dramatizes an important side effect of the telemedicine system:

"We now have a dramatic mechanism whereby we can teach what it really is like to talk to and deal with a patient having a disease like schizophrenia. Most medical students have never had the opportunity to talk to a patient with one of the mental diseases that they read about, and read about, and read about.

"With constraints for human rights and with informed consent, we can now allow students to talk to and observe such patients for the first time."

The educational aspects of the system between MGH and Bedford have taken several turns. In one, Dr. Thomas F. Dwyer, Project Coordinator for Telepsychiatry, headed a course to prepare VA Hospital psychiatrists for their board examinations in psychiatry.

Four of the specialists taking the course were from foreign countries. Besides the course content, they had to struggle with the cultural and language problems.

"They gained both confidence and competence," Dr. Dwyer said. "Whether they pass the psychiatric examinations or not, many have asked that we continue the television course so that they can keep up to date in the field."

Entering teleroom at MGH's Logan Airport Medical Station.

A Very Narrow Cable With a Wide Potential

A phenomenon called community antenna television seems likely to speed up some of the effects of telemedicine.

"Right now one single coaxial cable the diameter of your index finger can carry 40 different television channels," said Dr. Kenneth T. Bird, MGH Director of Telemedicine. "For most of urban America this system is two or more years away.

"When it evolves, our coaxial cables will have the capabilities of transmitting 80 to 120 channels. Just visualize, then, a city in which every private home, and every apartment, and every public area that wants to take part will have an average of 100 television channels coming in."

Dr. Bird would like to see many of these channels set aside as two-way communications. People in private homes would then be able to talk over television to people in other locations such as a television studio. Those channels would be used for education of all kinds.

"In the health area alone," Dr. Bird said, "on a given night we might have a program for patients with diabetes, for example. They would hear a discussion on one of the channels about some aspect of that disease. A panel of experts could receive direct questions from cameras spotted at locations throughout the two-way system. The interplay between experts and part of the home audience could appear on split screens."

Dr. Bird also envisions a wide use of television within the hospital of the near future. A patient in his room would be able to watch televised programs originating in the hospital to explain procedures he is awaiting.

Or someone with arthritis could switch on his bedside set to receive a short program on the general aspects of the disease. A variety of health education programs, taped or live, could be presented according to the needs of each patient.

To answer specific questions he might select a channel connected to the hospital telemedicine center. A health educator in the center would be available to use visual aids in answering.

(Continued from Page 3)

later sessions, the psychiatrist was able to help the man further.

As they tried the system themselves, psychiatrists soon abandoned their initial skepticism. They have treated patients from 6 to 60 years old. All age groups have accepted the system as a way of getting first-class medical care.

"The sense of personal contact is preserved to an amazing degree," Dr. Eisenberg said.

Dr. Dwyer has just completed a follow-up study of the first five patients he saw over the Logan-to-MGH system. Most of the five needed only two or three sessions. The maximum number of visits was six.

One of the five had been a lifelong sleepwalker. When this problem reached the point where it was disturbing his marriage, he sought professional help.

In the 20 months since his five sessions over television, he has suffered only two recurrences of sleepwalking and has also managed to give up cigarettes.

"The picture was the same with four of the first five patients," Dr. Dwyer said. "Two or more sessions had reversed some problem."

The success of the telepsychiatry experiment led to the construction of another microwave system – the one between the MGH and the Bedford VA Hospital about 25 road miles away.

"Now these activities," Dr. Bird said, "have led to the formulation of telecounsel."

(Related Stories on Page 4)

Discussing problems with Mrs. Marilyn Schwartz, an MGH Caseworker.

Filling out questionnaire after session.

The Heart Attack Revisited

In November of 1970 the *MGH News* began a long-term public-education campaign. Its purpose was to emphasize the need to seek prompt medical attention for the symptoms of a heart attack.

National in scope, the campaign sought the support of organizations around the country in printing and distributing a heart-attack chart. MGH cardiologists and a psychiatrist helped prepare it. It lists in separate columns the symptoms of a heart attack and other symptoms often mistaken for one.

Since November, references to the chart have appeared in newspapers of every state. At least three state heart associations and one county heart association in a fourth state have sought permission to reprint the chart. Other heart associations have requested copies.

A number of organizations such as Jaycees, fire departments, universities, and municipalities have asked for similar permission. In addition, the hospital's News and Public Affairs Office has received numerous chart requests from individuals across the country.

One irony of the effort involves Dr. Paul Dudley White, one of the cardiologists who helped devise the chart. Late on the night of Dec. 20, 1970, Dr. White suffered prolonged chest pain. He took his own advice and sought immediate medical attention. He was admitted to the MGH and fortunately escaped permanent damage to his heart.

Progress from the public-education campaign is expected to be slow. Physicians believe that, unlike Dr. White, most people have an ingrained fear of heart attacks that makes them hesitate to seek immediate medical help.

Yet prompt hospitalization during likely attacks is considered a key to saving tens of thousands of lives. The early hours of the attack are regarded as by far the most dangerous.

In an effort to maintain interest in the campaign and reach more people, the *MGH News* is again printing the heart-attack chart on page 8. Those who saved the original chart might want to give the new copy to a friend.

A Burgeoning in Use of Radiological Exams

Radiology was a tiny department in a small building when Dr. Laurence L. Robbins came to the MGH in 1939 as a resident. At that time four staff doctors and three residents formed the department.

The building has long since been torn down, and the ranks of personnel have swelled to the point that last year there were 31 staff doctors and 29 residents.

"Everything has essentially changed," Dr. Robbins said, as he reviewed his career. He will be stepping aside as Chief of Radiology in September.

In addition to a much larger staff and expanded quarters, there has been a much increased use of diagnostic X-ray examinations during Dr. Robbins' years at the MGH. Procedures and equipment have also become much more complicated.

Dr. Robbins said that following World War II there was a burgeoning in the utilization of radiology. The usefulness, he said, had not been fully appreciated before. Now the number of examinations done still increases at the rate of seven to ten percent a year. Doctors request more X rays than they used to, and newer methods are more time consuming and complex.

Equipment used in radiology has also changed. For example, Dr. Robbins said, radiologists used to spend 20 minutes in a darkened room in order to view a fluoroscope (an X-ray device used for examining deep body structure). Now there are image intensifiers and electronic devices which intensify the light patterns shown on the screen more than a thousand times so that they can be seen in daylight.

Television, videotaping and filming are also used more and more.

Explaining his move from the position of chief which he has held for 25 years, Dr. Robbins said he was tired of administration and "thought it was time to do a regular day's work, by interpreting films and teaching residents and students." Without the administrative duties, he hopes to "learn to be a radiologist again" and "renew knowledge in a wide variety of fields."

The statement can be taken as an example of his modesty, because the evidence shows that Dr. Robbins has never lost his ability as a radiologist. Last year, for example, he won the Gold Medal of the American College of Radiology, its highest honor.

It is only the most recent in a long list of regional and national honors and positions, including the Gold Medal of the Radiological Society of North America (Dr. Robbins is one of the few who have won the Gold Medal of both these organizations), memberships on the National Advisory Committee on Radiation, National Advisory of Radiological Health Council, and the Scientific Advisory Board of Consultants of the Armed Forces Institute of Pathology; presidencies of the New England Roentgen Ray Society, the Radiological Society of North America, the American Board of Radiology; Trustee of the American Board of Radiology, Chancellor of the American College of Radiology, Chairman of the Section on Radiology of the American Medical Association, and editor of *Golden's Roentgenology*.

In addition, Dr. Robbins has authored or coauthored 84 papers and books including significant contributions to the literature of diseases of the chest, his major field of interest. Many papers have dealt with radiation protection and radiological education.

During his 25 years as chief, he has fully trained more than 145 residents, and partially trained that many clinical fellows and other radiologists. Sixty of the doctors who served residencies under him have remained in academic departments, many becoming chiefs of radiology in hospitals throughout the U.S. and Canada, Central and South America, Europe and the Far East. Members of his department have written more than 500 papers and many books.

As an honor to him and those he has trained and directed, the April, 1971 issue of the *Radiologic Clinics of North America* was dedicated to Dr. Robbins and composed entirely of articles written by members of his department.

In the introduction, Dr. Murray L. Janower, former MGH Associate Radiologist, who recently became Chief of Radiology at St. Vincent Hospital in Worcester, wrote, "To say that Dr. Robbins is a superb radiologist only hints at his ability. Department members will attest to the fact that regardless of how long a case has been reviewed or the number of radiologists who have seen the film, Dr. Robbins inevitably produces an additional finding quite obvious to everyone after it has been pointed out.

"Dr. Robbins' ability to draw the correct diagnostic conclusion in the most difficult and complicated cases is uncanny; he has gained the respect of every physician, surgeon and radiologist in the hospital, as again and again his diagnoses have been confirmed.

"It is his ability to recognize and develop the best talents and traits of others that has made him a loved and respected chief and teacher."

Dr. Laurence L. Robbins with an antique glass-plate X ray dating from World War I.

Radiology – Considerably More Than X Rays

(Continued from Page 1)

Some of the newest developments in neuroradiology involve the use of thin tubes called catheters, which are placed within arteries and the tiny branches of arteries.

One use of these tubes is to treat a type of tumor that contains so many blood vessels that while it is being removed a patient might bleed to death during the surgery. Using a catheter, the neuroradiologist deposits tiny jellfoam pellets or glass beads into appropriate arteries. The pellets block circulation to the tumor, enabling its safe removal by the neurosurgeon.

Sometimes a neuroradiological procedure even substitutes for surgery in portions of the brain where an operation would cause irreparable damage. This is the case for some arteriovenous malformations, a condition in which blood is abnormally switched directly from the arteries to the veins by a swollen network of blood vessels.

Infants born with this abnormality are increasingly threatened by hemorrhage or by damage to nearby tissue that is squeezed as these vessels continue to enlarge. Injection of jellfoam pellets at the precise point can shut off the circulation, thereby stopping the dangerous enlargement.

A different technique is used for patients with a saccular aneurysm, a blood sac that puffs up inside one wall of a brain artery. A special magnetized catheter can be guided into the aneurysm. The magnetized tube permits an electric current to be applied within the aneurysm. As a result, blood within this sac eddies and clots, thus damaging the aneurysm while allowing normal circulation through the rest of the artery.

That particular procedure is done in inoperable cases or may be used as a preliminary to surgery in others.

Other subspecialties of radiology besides neuroradiology are involved in these frontiers. Such techniques can be applied to a patient who is bleeding so badly from the stomach or intestines that surgery is too risky. Using similar methods, the radiologist can locate the area of bleeding and isolate it from the rest of the circulation. Injection of certain drugs can then stop the bleeding.

"In general," Dr. Taveras said, "surgeons, when they open the abdomen of a patient who is hemorrhaging, have great difficulty in finding where blood may be coming from because they can only see the outside of the bowel, not the inside.

"Well, they can't open the whole bowel to look inside, but by localizing the bleeding for surgery with angiographic [X-ray] technique, then they know exactly where the bleeding point is. This has saved many lives."

Similar techniques are in various stages of development for diagnosis and treatment of diseases of blood vessels of the heart and lungs.

"One of the first to start these approaches was a neurosurgeon who, in the early '60s, began the treatment of arteriovenous malformations of the brain. It has been the radiologist who has become extremely adept at handling catheters and putting them into almost any place in the body, and it has been the radiologist who has further developed these approaches."

Radiologists are now beginning to explore a whole new area of diagnosis. Until recently, the X ray could show only what a given organ, like the heart or kidney, looks like. Now radiology is making it possible to show how well a given organ is working, or, as Dr. Taveras put it, "to study regional organ function.

"That applies to the lungs, the brain, the heart, the liver, the kidneys and the gastrointestinal tract," Dr. Taveras said. "Even the bone – the skeleton – is amenable to this kind of approach."

With these techniques radiologists can study such things as the effects on the brain of drugs like marijuana. In fact, one group in Dr. Taveras' Mallinckrodt Institute is doing just that.

In an interview with the *News* Dr. Taveras ranged over many other aspects of radiology's new frontiers. In response to questions, he also described his own career.

He was born Sept. 27, 1919, in the Dominican Republic. At the University of Santo Domingo he laid the foundations for his specialty in radiology.

As the top student in his class, he became an assistant in anatomy in his third year of medical school. He remained a student assistant during the rest of the six-year course.

"I think this influenced my choice of career since radiology ties in very nicely with anatomy."

Dr. Taveras holds a second doctor of medicine degree, earned at the University of Pennsylvania School of Medicine. From 1950 to 1965 when he assumed his St. Louis post, he served at Columbia University's College of Physicians and Surgeons, and Neurological Institute.

During that period he organized the first program in the United States to train neuroradiologists for teaching hospitals. He founded the American Society of Neuroradiology which has about 150 members.

"The demand requires possibly 500 neuroradiologists as a minimum in the United States," Dr. Taveras said, "so we are up to one-third of that figure."

In the fall he will have an opportunity to add to the total as a Professor of Radiology at Harvard Medical School.

Dr. Juan M. Taveras

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CUT ALONG DOTTED LINE

DO YOU KNOW THAT:

1. **The great majority of people hospitalized with heart attacks survive.**
2. **Many who do not survive had delayed for many hours telephoning their physicians.**
3. **Survivors of heart attacks usually live for many years.**
4. **Most people who recover from heart attacks can work and lead normal lives.**

BUT:

If you are going to take advantage of lifesaving new techniques and your doctor's ability to help you lead a normal postattack life, you must let him know immediately when you are having symptoms of an attack. Know your warning signs, and if need arises, seek prompt professional opinion. Your first impulse will be to delay. Don't! Ask a relative or neighbor to take you to a hospital emergency room immediately if you cannot reach your doctor by telephone.

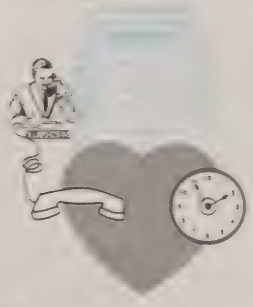
Column 1 will help you judge whether your warning signs warrant seeking professional advice. *Column 2* will help keep you from becoming unnecessarily concerned with signs unrelated to a heart attack:

May Be a Heart Attack If

- **Prolonged heavy pain under the breastbone lasting at least 5-10 minutes.** Pain is usually a severe, crushing one, but may be a slight one feeling like heartburn or indigestion.

  This may or may not be accompanied by sweating and profound weakness and rarely by real breathlessness.

  This chest pain may or may not spread, most often to the left arm, less frequently to the neck and jaws, and rarely to the back or abdomen.



Very Unlikely a Heart Attack If

- Sharp, shooting pains last no more than a very few seconds; nor if such pains are repetitive.
- Pain lasts only a very few minutes and comes with exercise or excitement and goes after stopping either. (May be a heart problem called angina pectoris. Doctor should definitely be consulted within 24 hours, but not on emergency basis.)
- Pain is aggravated each time you breathe.
- Pain is associated with tenderness. Painful area is tender to the touch.
- Pain is a numbness or tingling sensation in fingers and toes and is accompanied by lightheadedness. (This is probably due to nervousness.)
- Pain is increased by moving arms. (Is probably due to muscle strain.)
- What seemed like breathlessness is really:
  A feeling you can't take a deep breath.
  A feeling you can't swallow easily.
  (These are probably due to tension.)
- Heartbeat seems to skip. (Common and seldom a cause for worry.)

Should you have the first sign listed in Column 1 rather than the signs listed in Column 2, telephone immediately for medical advice. The sign may result from a cause such as indigestion but is serious enough to warrant immediate professional opinion. Chances that you are having a heart attack increase markedly if symptoms in Column 1 increase steadily, especially if they become intolerable.

Massachusetts General Hospital News